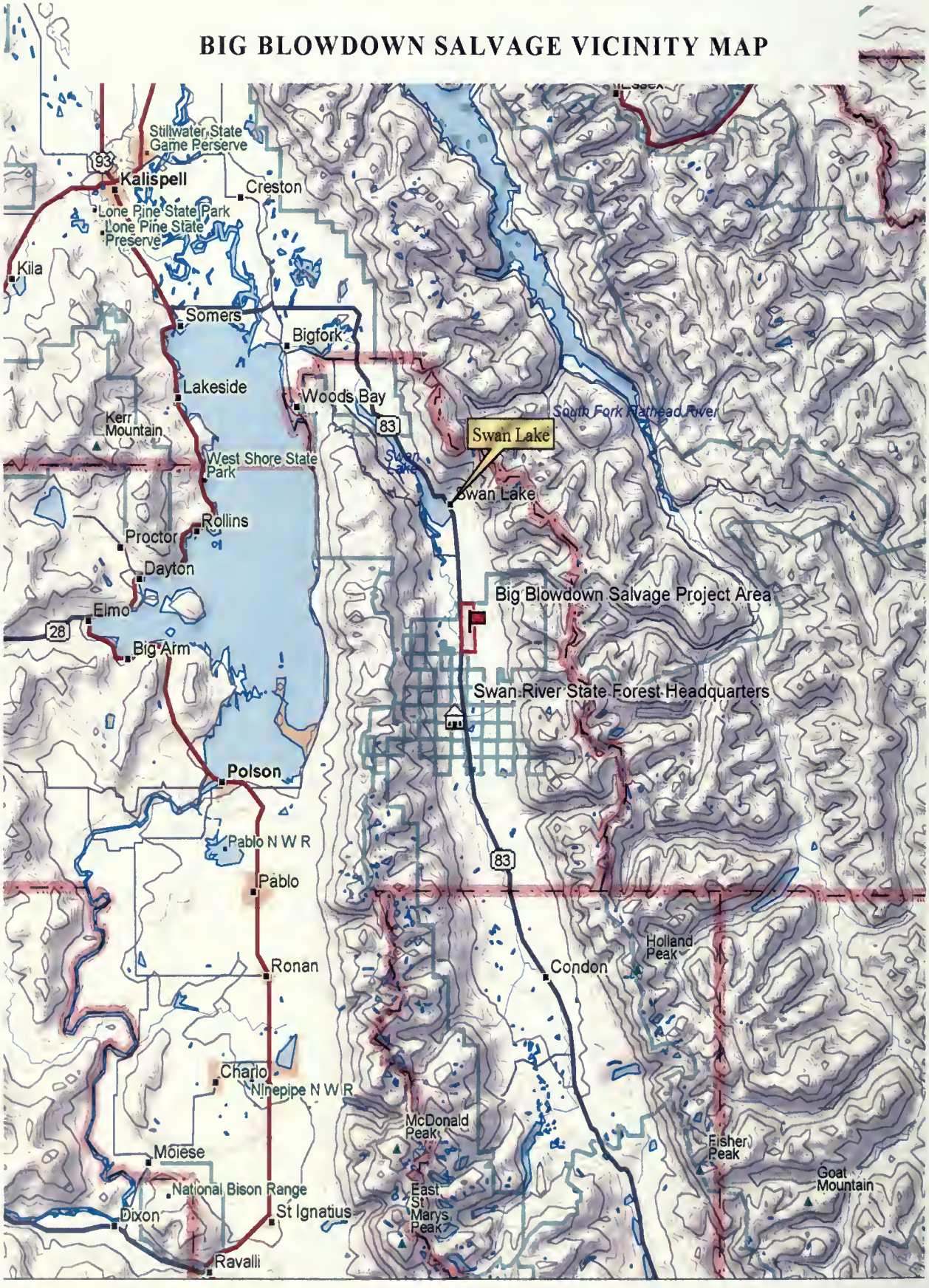
BIG BLOWDOWN SALVAGE

CHECKLIST ENVIRONMENTAL ASSESSMENT

SWAN RIVER STATE FOREST
MAY 7, 2003

BIG BLOWDOWN SALVAGE VICINITY MAP



DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

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BIG BLOWDOWN SALVAGE PROJECT
CHECKLIST ENVIRONMENTAL ASSESSMENT AND FINDING
May 9, 2003

Enclosed is a copy of the Big Blowdown Salvage Timber Sale Checklist Environmental Assessment and Finding. I encourage you to review the document and direct any comments or questions to: Swan River State Forest, 58741 Highway 83 South, Swan Lake, Montana 59911. The Department of Natural Resources and Conservation is planning to present the Big Blowdown Salvage Project to the State Board of Land Commissioners on May 19, 2003. Comments must be received by May 18, 2003. Please include your name, address, and the title of the document with your comments.

The proposed project is approximately ten miles south of Swan Lake and predominantly along the east side of Highway 83 between Soup Creek Road and Point Pleasant. The primary purpose of the project is to salvage wind-damaged and blown-down trees that resulted from a strong windstorm in April of 2002.

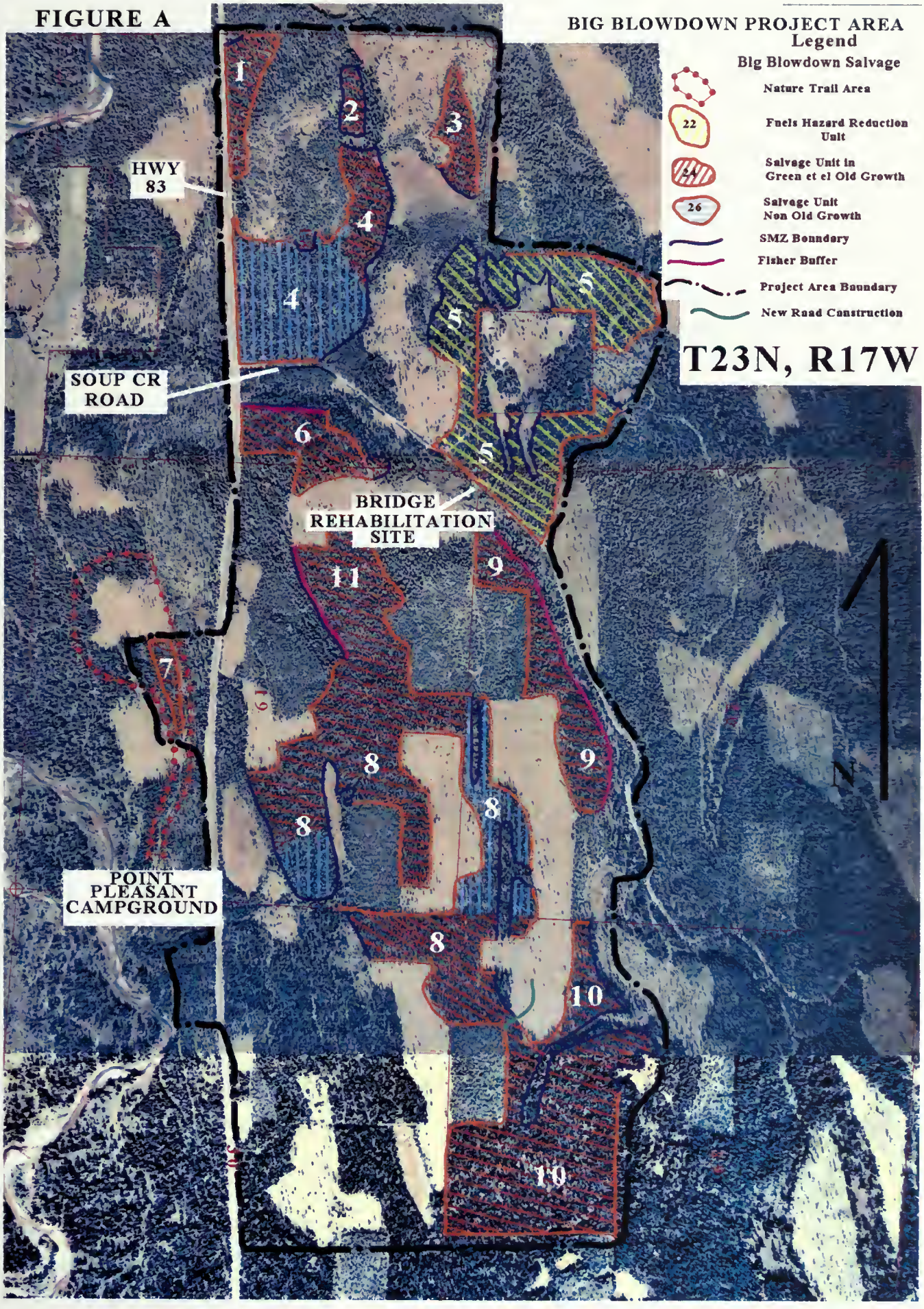
I welcome your questions and comments.

Sincerely,

Daniel J. Roberson
Unit Manager
Swan River State Forest
58741 Highway 83 South
Swan Lake, Montana 59911
(406)754-2301

DJR:mb
Enclosure
Cc: Big Blowdown SP

FIGURE A


BIG BLOWDOWN PROJECT AREA
Legend
Big Blowdown Salvage
Nature Trail Area
22
Fuels Hazard Reduction Unit
Salvage Unit in Green et el Old Growth
26
Salvage Unit Non Old Growth
SMZ Bonndary
Fisher Buffer
Project Area Boundary
New Road Construction
T23N, R17W
HWY 83
SOUP CR ROAD
BRIDGE REHABILITATION SITE
POINT PLEASANT CAMPGROUND
1
2
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N

BIG BLOWDOWN SALVAGE
ENVIRONMENTAL ASSESSMENT CHECKLIST
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CHECKLIST ENVIRONMENTAL ASSESSMENT (CEA)

Project Name: Big Blowdown Salvage Project

Proposed Implementation Date: Summer through winter 2003

Proponent: Montana Department of Natural Resources and Conservation (DNRC)

Type and Purpose of Action: On April 14, 2002, a strong windstorm blew down approximately 1 million board feet (MMBF) of live timber on approximately 550 acres of Swan River State Forest. Swan River State Forest also has an ongoing severe infestation of Douglas-fir bark beetles, which has caused heavy tree mortality to another 0.5 MMBF in the same area. In response to these events the Department of DNRC, as manager of the Swan River State Forest, is proposing a forest-management project that would salvage trees killed and damaged by wind, insect infestations, and disease infections.

The lands involved in the proposed project are held by the State of Montana in trust for the support of specific beneficiary institutions. These include public schools, State colleges and universities, and other specific State institutions, such as the School for the Deaf and Blind *(Enabling Act of February 22, 1889; 1972 Montana Constitution, Article X, Section 11)*. The Montana State Board of Land Commissioners (Land Board) and DNRC are required by law to administer these trust lands to produce the largest measure of reasonable and legitimate return over the long run for these beneficiary institutions, *Section 77--1-202, Montana Codes Annotated (MCA)*.

The State is required by law to establish a salvage timber program that provides for the timely harvest of dead and dying timber that is threatened by insects, disease, wildfires, or wind on State Forests. Under this requirement, the Department shall, to the extent practicable, harvest dead and dying timber before there is substantial wood decay and value loss (Section 77-5-207, MCA).

In 1996, DNRC adopted the State Forest Land Management Plan (SFLMP) under an Environmental Impact Statement (EIS) Record of Decision and subsequent approval by the Land Board. This project is conceived and proposed in accordance with the direction provided by the SFLMP.

The objectives of the Big Blowdown Salvage project:

- Recover revenue for the school trust by salvaging wind-damaged/ blown-down trees and trees that have been killed or damaged by attacks from Douglas-fir bark beetles or white pine blister rust.
- Contribute 1 to 1.5 MMBF to the Northwestern Land Office (NWLO) portion of the annual timber harvest on State trust lands that is required by State law (*77-5-221 through 223, MCA*).
- Reduce the risk of catastrophic fire to DNRC lands and adjacent landowners by reducing forest fuel loading caused by blowdown, insect infestations, and disease infections.
- Provide funding for streamside rehabilitation projects at culvert crossings and old bridge sites to reduce the likelihood of sediment delivery to streams.
- Improve drainage, water quality, and safety, as recommended by current Best Management Practices (BMPs), by completing road improvement at sites on existing roads.
- Comply with the Swan Valley Grizzly Bear Agreement (SVGBCA) and other applicable rules, standards, and guidelines.

Location: Sections 17, 18, 19, 20, 29, and 30, T24N, R17W (see maps on the back of the front cover)

County: Lake

I. PROJECT DEVELOPMENT

1. PUBLIC INVOLVEMENT, AGENCIES, GROUPS OR INDIVIDUALS CONTACTED: Provide a brief chronology of the scoping and ongoing involvement for this project.	An Initial Scoping letter for this project was mailed on October 17, 2002, to landowners, Agency representatives, various specialists, and all interested parties that have requested information on DNRC projects. An additional letter that clarified DNRC's approach to salvage in the proximity of the Sprunger-Whitney Nature Trail was sent on November 21, 2002, to all respondents of the Initial Scoping letter. On November 25, 2002, Sue Ellison of the *Bigfork Eagle* wrote a news article on the possible effects of the proposed project on the Sprunger-Whitney Nature Trail. *APPENDIX B - SCOPING DOCUMENTATION* contains lists of those receiving the Initial Scoping document, respondents, a summary of issues relevant to this project, and where those issues are addressed within this CEA.
2. OTHER GOVERNMENTAL AGENCIES WITH JURISDICTION, LIST OF PERMITS NEEDED:	Montana Department of Fish, Wildlife, and Parks (DFWP) has jurisdiction over the management of fisheries and wildlife in the project area. DFWP is on the mailing list and has received the initial proposal and newsletter. DNRC has an ongoing contract with DFWP to collect data and monitor streams for the conditions of fisheries habitat and the presence/absence of bull trout and westslope cutthroat trout in the tributaries on Swan River State Forest. PERMITS THAT MAY BE REQUIRED TO IMPLEMENT THE PROPOSED ACTIONS • A stream Preservation Act Permit (124 Permit) is required from DFWP for activities that may affect the natural shape and form of a stream or its banks or tributaries. • A short-term Exemption from Montana's Surface Water Quality Standards (318 Authorization), issued by the Montana Department of Environmental quality (DEQ) may be required if: – temporary activities would introduce sediment above natural levels into streams, or – DFWP feels a permit is necessary after reviewing the mitigation measures in the 124 Permit.

I. PROJECT DEVELOPMENT

2. OTHER GOVERNMENTAL AGENCIES WITH JURISDICTION, LIST OF PERMITS NEEDED (continued):	DNRC is a member of the Montana Airshed Group, which regulates slash burning done by DNRC. DNRC received an air-quality permit through participation in this group.
3. ALTERNATIVE CONSIDERED:	***No-Action Alternative*** -No timber would be harvested, though firewood gathering and some salvage logging would likely continue. -Roads would be only maintained; no roads would be built or reconstructed. -When funding is available and equipment is in the area, roads and closures would continue to be maintained. -Efforts to suppress fires would continue. -Efforts to control the spread of weeds would continue. -Trees would continue to die from attacks of Douglas-fir bark beetles and diseases such as root rot. -Natural events, including plant succession, trees blown down by wind, insect and disease outbreaks, and wildfires, would continue to occur. - Future actions, including timber harvesting, would be proposed and go through the appropriate environmental analysis. The No-Action Alternative is used as a baseline for comparing the effects that the Action Alternative would have on the environment, and is considered a possible alternative for selection. ***Action Alternative*** - Salvage between 1 to 1.5 MMBF of wind-damaged and blown-down trees and trees killed or damaged by Douglas-fir bark beetles or white pine blister rust. - Remove an old wooden bridge on Soup Creek that accesses an old road system in the eastern portion of Section 19 and the southern portion of Section 20. Rehabilitate the site to prevent sediment from entering Soup Creek. - Build approximately 0.25 mile of new road to access the road system isolated by the removal of the old wooden bridge.

I. PROJECT DEVELOPMENT

3. ALTERNATIVE CONSIDERED (continued):	- Replace native and undersized culverts, repair culverts that are too short, and upgrade the road-surface drainage to meet current BMP standards on haul roads. - Apply treatment to reduce forest fuels and lessen the risk of catastrophic fire to DNRC lands and adjacent landowners. - The licensee of the Sprunger-Whitney Nature Trail (Friends of the Wild Swan) would have the right to exercise part 11, B, 2 of their Land Use License, which allows the licensee to purchase logs from DNRC in lieu of salvaging Area B.

II. IMPACTS ON THE PHSYICAL ENVIRONMENT

RESOURCE	[Y/N] POTENTIAL IMPACTS AND MITIGATION MEASURES N=Not present or No Impact will occur Y=Impacts may occur (explain below)
4. GEOLOGY AND SOIL QUALITY STABILITY AND MOSITURE: Are fragile, compactable or unstable soils present? Are there unusual geologic features? Are there special reclamation considerations? Are cumulative impacts likely to occur as a result of this proposed action?	[Y] **EXISTING ENVIRONMENT** The proposed project area lies in the lower portions of the Swan River valley. Glacial moraines formed the unnamed watersheds in the proposed project area. The dominant soil types found in the project area are deep glacial tills and glacial outwash. In the proposed project area, DNRC has conducted timber harvesting since the 1960s, mainly with the use of ground-based yarding systems. Ground-based yarding displaces and compacts the productive layers of soil, affecting soil productivity. The most effective methods to minimize the loss of soil productivity is properly spacing skid trails and restricting the season of use. Skid trails in areas of past harvesting are adequately spaced and are regenerating well. Soil types in the project area are primarily level to rolling glacial till. The project area also contains several wetland marshes and fens. No area of high-risk soil were identified in the project area by the Flathead National Forest (FNF) Soil Survey. *TABLE 4-1 - SUMMARY OF DIRECT EFFECTS OF ALTERNATIVES ON SOILS displays* a list of soil types found in the project area and their associated management implications.

TABLE 4-1 - SUMMARY OF DIRECT EFFECTS OF ALTERNATIVES ON SOILS

DESCRIPTION OF PARAMETER	NO-ACTION ALTERNATIVE	ACTION ALTERNATIVE
Acres of harvest	0	550
Acres of tractor yarding	0	550
Acres of skid trails and landings[1]	0	110
Acres of moderate impacts[2]	0	83
Percent of harvest area with impacts	0%	15.1%

[1] 20 percent of ground based area
[2] 75 percent of ground-based skid trails

4. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE (continued):

DIRECT AND INDIRECT IMPACTS

No-Action Alternative

No ground-based equipment would be operated under this alternative to affect soil productivity. Soils in the project area would be unchanged from the existing conditions.

Action Alternative

Approximately 83 acres of ground would be directly impacted; some would be in previously harvested areas, others would occur in areas not previously managed for timber (*TABLE 4-2 – SOIL MAP UNIT DESCRIPTIONS FOR THE SOUTH WOOD PROJECT AREA*). Ground-based skidding equipment would cause compaction and displacement on approximately 550 acres, leaving approximately 15 percent of the proposed harvest units in an impacted condition. To minimize these impacts, harvesting activities would only occur when soil moisture is at or below 20 percent, or the ground is frozen or covered with snow. Disturbance levels may be lower if activities were conducted on frozen or snow-covered ground.

TABLE 4-1 – SOIL MAP UNIT DESCRIPTIONS FOR THE SOUTH WOOD PROJECT AREA

MAP UNIT:	26A-7	26C-7
Description	Deep glacial till, 0-20%	Glacial moraines, 0-20%
Soil drainage	Well drained	Well drained
Road limitations	Low	Low
Topsoil displacement and compaction	Moderate (severe if wet)	Moderate (severe if wet)
Seedling establishment	Good	Good
Erosion (bare surface)	Low	Low
Notes	Deep, productive soil that is well suited to tractor operation. Limited dry season of use.	Deep, productive soil. Topsoil depth is important.

II. IMPACTS ON THE PHSYICAL ENVIRONMENT

4. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE (continued):	**CUMULATIVE IMPACTS** ***No-Action Alternative*** No soil would be disturbed and no harvest units of past harvesting would be reentered; no cumulative impacts to soils would occur. ***Action Alternative*** The salvage harvest would enter both old harvest units and stands that have had no harvesting. Some of the stands have had small salvage operations within 200 feet of existing roads. Skid trails from past harvesting would be used if they are properly located and spaced. Use of these trails would minimize the risk of cumulative impacts to soil productivity. The proposed project area has been evaluated and most of the existing skid trails are well located and properly spaced; therefore, additional skid trails and subsequent cumulative effects to soil productivity would be minimal. Areas not previously harvested would have cumulative impacts to soil productivity similar to those described under DIRECT AND INDIRECT IMPACTS.
5. WATER QUALITY, QUANTITY AND DISTRIBUTION: Are important surface or groundwater resources present? Is there potential for violation of ambient water quality standards, drinking water maximum contaminant levels, or degradation of water quality? Are cumulative impacts likely to occur as a result of this proposed action?	[Y] The project area lies within the lower reaches of Soup Creek and other small tributaries. See *APPENDIX D - WATERSHED AND HYDROLOGY ANALYSIS* for pertinent information.
6. AIR QUALITY: Will pollutants or particulate be produced? Is the project influenced by air quality regulations or zones (Class I airshed)? Are cumulative impacts likely to occur as a result of this proposed action?	[Y] **EXISTING ENVIRONMENT** The project is within Montana Airshed 2 and is not within a Class I Airshed. Air quality within this airshed is considered good. Temporary reductions in air quality currently occur from wildfires, prescribed broadcast burns, and road dust.

II. IMPACTS ON THE PHSYICAL ENVIRONMENT

6. AIR QULITY (continued):	**DIRECT AND INDIRECT IMPACTS** ***No-Action Alternative*** The existing condition would not change. ***Action Alternative*** Postharvest burning would produce smoke emissions; log hauling and other project-related traffic on dirt roads would increase road dust during dry periods. None of the increases are expected to exceed standards or impact local population centers if burning is completed within the requirements imposed by the Montana Airshed Group and dust-abatement material is applied to roads during dry periods. **CUMULATIVE IMPACTS** ***No-Action Alternative*** The existing condition would not change. ***Action Alternative*** Additional smoke produced from prescribed burning on adjacent USFS, private, and State trust forestland would remain within the standards for air quality, but cumulative effects during peak burning periods could affect individuals with respiratory illnesses at local population centers for short durations. All known major burners operate under the requirements of the Montana Airshed Groups, which regulate the amount of emissions produced cumulatively by major burners.
7. VEGETATION COVER, QUANTITY AND QUALITY: Will vegetative communities be permanently altered? Are any rare plants or cover types present? Are cumulative impacts likely to occur as a result of this proposed action?	[Y] **EXISTING ENVIRONMENT** The project is located in Swan River State Forest and directly affects the timber base and other attributes at the forest-management level. The project views the analysis area on 2 scales: the Swan River State Forest management block and the project area. The concentrated blowdown takes in an area of 1,500 acres, primarily east of Highway 83 in the northern portion of Swan River State Forest (*FIGURE A - BIG GLOWDOWN PROJECT AREA*). The most common habitat types throughout the project area are grand fir and subalpine fir. *APPENDIX C - VEGETATION ANALYSIS* describes indepth the vegetation and the effects of the proposed alternatives.

II. IMPACTS ON THE PHSYICAL ENVIRONMENT

8. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS: Is there substantial use of the area by important wildlife, birds or fish? Are cumulative impacts likely to occur as a result of this proposed action?	[Y] *APPENDIX E - WILDLIFE ANALYSIS* describes the existing environment for wildlife in detail and analyzes the anticipated effects to wildlife by the proposed no-action and action alternatives. *APPENDIX F - FISHERIES ANALYSIS describes* the existing environment for fisheries in detail and analyzes the anticipated effects to fish by the proposed no-action and action alternatives.
9. UNIQUE, ENDANGERED, FRAGILE OR LIMITED ENVIRONMENTAL RESOURCES: Are any federally listed threatened or endangered species or identified habitat present: Any wetlands? Sensitive Species or Species of special concern? Are cumulative impacts likely to occur as a result of this proposed action?	[Y] Bald eagles, Canada lynx, gray wolves, grizzly bears, fishers, and pileated woodpeckers could possibly use the project area. *APPENDIX E - WILDLIFE ANALYSIS* describes the project's anticipated effects on these specific wildlife species. *APPENDIX F - FISHERIES ANALYSIS* describes the project's anticipated effects to bull trout and westslope cutthroat trout. *APPENDIX C - VEGETATION ANALYSIS* analyzes the project's anticipated effects to sensitive plants. The project area includes the fen at Point Pleasant and other wetlands. *APPENDIX D - WATERSHED AND HYDROLOGY ANALYSIS* describes in detail the project's anticipated effects to these wetlands.
10. HISTORICAL AND ARCHAEOLOGICAL SITES: Are any historical, archaeological or paleontological resources present?	[N] **EXISTING ENVIRONMENT** A search of historical, archaeological, and paleontological literature and records by DNRC (*P. Rennie 12/20/02*) indicated that no cultural resources have been found in the project area.
11. AESTHETICS: Is the project on a prominent topographic feature? Will it be visible from populated or scenic areas? Will there be excessive noise or light? Are cumulative impacts likely to occur as a result of this proposed action?	[Y] **EXISTING ENVIRONMENT** The public generally views the project area while sightseeing. The views of vegetation and topography next to roads or trails are known as foreground views. The views of hillsides or drainages from roads and trails are known as middleground views. The views of horizons, mountain ranges, or valleys are known as background views. Since the project area is primarily flat, most views are foreground views of open and dense forest stands and openings caused by past harvesting. Some old harvest units offer middleground views, usually consisting of hillsides or drainages.

II. IMPACTS ON THE PHSYICAL ENVIRONMENT

11. AESTHETICS (continued):	[Y] **EXISTING ENVIRONMENT** The public generally views the project area while sightseeing. The views of vegetation and topography next to roads or trails are known as foreground views. The views of hillsides or drainages from roads and trails are known as middleground views. The views of horizons, mountain ranges, or valleys are known as background views. Since the project area is primarily flat, most views are foreground views of open and dense forest stands and openings caused by past harvesting. Some old harvest units offer middleground views, usually consisting of hillsides or drainages. **DIRECT AND INDIRECT IMPACTS** ***No-Action Alternative*** In the short term, shrubs and trees would continue to grow along the roads and limit views. ***Action Alternative*** Harvest treatments would aesthetically affect the harvest area by: - causing some damage to vegetation; - creating logging slash; - disturbing soil along skid trails, landings, and while constructing new roads; and - creating landing piles along roads in the project area. For the most part, foreground views would have slightly fewer trees and down logs. Middleground views would not become noticably different. ***CUMULATIVE IMPACTS*** ***No-Action and Action Alternatives*** In addition to the direct and indirect effects of this project, the following effects of other projects may occur: • Natural processes on the landscape, such as wildfires, blown-down trees, insect infestations, and disease infections, would continue to alter the view over time. • In the short term, present activities, such as firewood gathering and timber harvesting on adjacent Plum Creek Timber Company and State trust lands, would affect the view.

II. IMPACTS ON THE PHSYICAL ENVIRONMENT

11. AESTHETICS (continued):	• Salvage harvesting and firewood gathering would alter foreground views by damaging vegetation along roads and leaving some debris on road surfaces and in ditches. DNRC's administration of salvage permits would keep roadside debris at a minimum. Middleground viewing would remain unaltered.
12. DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR OR ENERGY: Will the project use resources that are limited in the area? Are there other activities nearby that will affect the project? Are cumulative impacts likely to occur as a result of this proposed action?	[N] None
13. OTHER ENVIRONMENTAL DOCUMENTS PERTINENT TO THE AREA: Are there other studies, plans or projects on this tract? Are cumulative impacts likely to occur as a result of other private, state or federal current actions within the analysis area, or from future proposed state actions that are under MEPA review (scoping) or permitting review by any state agency within the analysis area?	[Y] The Goat Squeezer EIS and Soup Creek Salvage CEA were considered in the cumulative effects analysis. In relation to grizzly bears, cumulative effects of timber management and road construction were analyzed in the Environmental Assessment (EA) and Biological Opinion for the SVGBCA (*U.S. Fish and Wildlife Service [USFWS], 1995a and 1995b*). Timber harvesting and road use related to the proposed alternative would be conducted in accordance with this agreement (*USFWS et al, 1997*).
14. HUMAN HEALTH AND SAFETY: Will this project add to health and safety risks in the area?	[N]
15. INDUSTRIAL, COMMERCIAL AND AGRIBULTURAL ACTIVITIES AND PRODUCTION: Will the project add to or alter these activities?	[N]

III. IMPACTS ON THE HUMAN POPULATION

16. QUANTITY AND DISTRIBUTION OF EMPLOYMENT: Will the project create, move or eliminate jobs? If so estimated number. Are cumulative impacts likely to occur as a result of this proposed action?	[N] The wood-product industry currently employs people in this area. Due to the relatively small size of the timber sale program, this proposed action would result in no measurable cumulative impacts on employment.
17. LOCAL AND STATE TAX BASE AND TAX REVENUES: Will the project create or eliminate tax revenue? Are cumulative impacts likely to occur as a result of this proposed action?	[N] People currently employed in the wood-product industry in this region are paying income taxes. Due to the relatively small size of the timber sale program, this proposed action would result in no measurable cumulative impact on tax revenues.
18. DEMAND FOR GOVERNMENT SERVIECES: Will substantial traffic be added to existing roads? Will other services (fire protection, police, schools, etc) be needed? Are cumulative impacts likely to occur as a result of this proposed action?	[N] No measurable cumulative impacts related to demand for government services would result from this proposed action due to the relatively small size of the timber sale program, the short-term impacts to traffic, the small possibility of a few people temporarily relocating to the area, and the lack of other timber sales in the adjacent area.
19. LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS: Are there State, County, City, USFS, BLM, Tribal, etc. zoning or management plans in effect?	[Y] In June 1996, DNRC began a phased-in implementation of the SFLMP. The management direction provided in the SFLMP comprises the framework within which specific project planning and activities take place. The SFLMP philosophy and appropriate Resource Management Standards have been incorporated into the design of the proposed action.
20. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITES: Are wilderness or recreational areas nearby or accessed through this tract? Is there recreational potential within the tract? Are cumulative impacts likely to occur as a result of this proposed action?	[Y] **EXISTING ENVIRONMENT** The Big Blowdown Salvage Project area receives moderate recreational use throughout the year. The area is primarily used for berry picking, snowmobiling, bicycling, fishing, hiking, hunting, and some camping. A short section of the Sprunger-Whitney Nature Trail, maintained by Friends of the Wild Swan, lies within the western boundary of the project area.

III. IMPACTS ON THE HUMAN POPULATION

20. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITES (continued):	**DIRECT AND INDIRECT IMPACTS** ***No-Action Alternative*** Recreational uses would not change. ***Action Alternative*** Harvesting activities may disturb normal movement patterns of game, which may affect hunter success. Short delays due to log hauling, snowplowing, and road construction may inconvenience snowmobilers, bicyclists, and other recreationists. However, recreational use is not expected to change with the implementation of this project, though the amount of use within the project area may change. Recreational users may use adjacent areas to avoid harvesting and log-hauling activities. The status of open, restricted, and closed roads would not change with the implementation of this project. Some salvage activities are planned adjacent to the Sprunger-Whitney Nature Trail. Logs would not be yarded across the trail, but logs would be yarded across a short section of old highway, which accesses the trail. *APPENDIX A - STIPULATIONS AND SPECIFICATIONS* contains specific contractual stipulations that are intended to protect the trail and its interpretive signs from physical damage during operations. The salvage harvest would remove some dead standing and blown down trees along the east side of the Sprunger-Whitney Nature Trail for a distance of approximately 900 feet of the trail. The tree salvage would disturb the vegetation slightly for a short time. Tree mortality from forest diseases and wind damage cannot not be viewed from this portion of the trail, but ample examples are along other portions of the trail. **CUMULATIVE IMPACTS** ***No-Action Alternative*** Some recreational users may be reluctant to use roads within the project area if roads continue to deteriorate; however, recreational use is not expected to change. ***Action Alternative*** The combined harvesting and log-hauling activities of this project, the Goat Squeezer Timber Sale Project, and Soup Creek Salvage

III. IMPACTS ON THE HUMAN POPULATION

20. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITES (continued):	Project within and adjacent to the project area may displace recreational use to adjacent areas. All levels of existing recreational use on Swan River State Forest are expected to continue.
21. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING: Will the project add to the population and require additional housing? Are cumulative impacts likely to occur as a result of this proposed action?	[N] Due to the relatively small size of the timber sale program and the fact that people are already employed in the woods industry in the region, no measurable cumulative impacts related to population and housing would be expected.
22. SOCIAL STRUCTURES AND MORES: Is some disruption of native or traditional lifestyles or communities possible?	[N]
23. CULTURAL UNIQUENESS AND DIVERSITY: Will the action cause a shift in some unique quality of the area?	[N]
24. OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES: Is there a potential for other future uses for easement area other than for timber management? Is future use hypothetical? What is the estimated return to the trust? Are cumulative impacts likely to occur as a result of this proposed action?	[Y] **EXISTING ENVIRONMENT** The revenue and cost estimates of return on the Big Blowdown Salvage Project are estimates intended for relative comparison of alternatives and are not intended to be used as absolute estimates of return. This analysis compares the action and no-action alternatives. The stumpage value was estimated using the most current transaction-evidence equation. The transaction-evidence appraisal system uses a multivariate regression equation to estimate the stumpage price for a timber sale based on characteristics and market data of past sales. Assumptions: 1. Development costs for the action alternative equal $34,600 and will be paid by the contractor. 2. The estimated harvest volume is 7,500 tons. 3. The stumpage value is $21.43 per ton.

III. IMPACTS ON THE HUMAN POPULATION

24. OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES (continued):

4. Project forest improvement (FI) fees are $10.45 per ton.

This analysis is based on information available during the development of this CEA; information and estimates may change by the time of the actual sale. This analysis considers only the direct benefits to the community and school trusts; the benefits associated with the silvicultural treatments undertaken or any other indirect benefits or costs are not considered.

FI monies fund a wide range on investments in the forest that are generally expected to increase future trust revenue. Activities utilizing these funds include tree planting, site preparation, slash treatment, and precommercial thinning.

DIRECT AND INDIRECT IMPACTS

No-Action and Action Alternatives

TABLE 24-1 PROJECT COSTS AND BENEFITS

	NO-ACTION ALTERNATIVE		ACTION ALTERNATIVE	
	TOTAL DOLLARS	DOLLARS PER TON	TOTAL DOLLARS	DOLLARS PER TON
Development costs	$0.00	$0.00	$34,600	$4.61
FI	$0.00	$0.00	$78,375	$10.45
Stumpage Revenue (gross trust revenue)	$0.00	$0.00	$160,708	$21.43
Total dollars collected by the State	$0.00	$0.00	$239,083	$31.88

Since no direct economic activity is associated with the No-Action Alternative, no local employment or wages would be directly affected. The average employment and wage effects are found in *TABLE 24-2 - AVERAGE EMPLOYMENT IMPACT DUE TO THE ACTION ALTERNATIVE.*

TABLE 24-2 AVERAGE EMPLOYMENT IMPACT - ACTION ALTERNATIVE

	EMPLOYMENT	WAGES
Average	10.58 jobs per MMBF	$34,000 per job
Estimated total effect of Big Blowdown Salvage Project	16 jobs	$544,000

III. IMPACTS ON THE HUMAN POPULATION

24. OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES (continued):	**CUMULATIVE IMPACTS** ***No-Action and Action Alternatives*** Because these logs are salvaged from blown-down timber, if they are not harvested, the logs will lose their commercial value and the benefits described above will be permanently lost to the school trust.

EA Checklist Prepared By:	Name:	Title:
	Dan Roberson	Forest Management Supervisor
	Tony Nelson	Hydrologist
	Norm Merz	Wildlife Biologist
	Paul Engelman	Forest Economist
	Margaret Beck	Publication Specialist Technician
	Wanemah Hulett	Publication Specialist Technician

IV. FINDING (see APPENDIX G - FINDING)		
25. ALTERNATIVE SELECTED:		
26. SIGNIFICANCE OF POTENTIAL IMPACTS:		
27. Need for Further Environmental Analysis: [ ] EIS [ ] More Detailed EA [X] No Further Analysis		

EA Checklist Approved By:

Robert L. Sandmen
Name

Stillwater Unit Manager
Title

Robert L. Sandmen
Signature

5/8/03
Date

APPENDIX A

STIPULATIONS AND SPECIFICATIONS

INTRODUCTION

The stipulations and specifications for the Action Alternative were identified or designed to prevent or reduce the potential effects to the resources considered in this analysis. Stipulations and specifications are, in part, a direct result of identifying issues and resource concerns. This section is organized by resource.

Stipulations and specifications that apply to operations required by the contract and occurring during the contract period will be contained within the Timber Sale Contract; as such, they are binding and enforceable. Project administrators enforce stipulations and specifications for all activities relating to the project that may occur during or after the contract period.

The following stipulations and specifications are incorporated into the action alternative to mitigate the potential effects on resources.

SPRUNGER-WHITNEY NATURE TRAIL

- No equipment will operate within 50 feet of the trail, except where the trail intersects with the "old highway". Logs will be winched from one side of the trail, but not across the constructed trail.
- The trail's interpretive plaques and signs and what they represent would be protected from disturbance.

WATERSHED AND FISHERIES

- Management standards of the SMZ Law (*75-5-301, MCA*) are implemented. Areas adjacent to streams or lakes within or adjacent to the harvest areas will have delineated SMZs to protect and maintain water quality.
- Brush will be removed from road prisms to allow effective road maintenance. Improved road maintenance will reduce sediment delivery.
- Equipment leaking fluids will not be permitted to operate at stream-crossing construction sites.
- The contractor will be responsible for the immediate cleanup of any spills (fuel, oil, dirt, etc.) that would affect water quality.
- Culvert sizing on roads will be for a 50-year flood event, as recommended by a DNRC hydrologist.
- Where culvert removals and installations are planned, stream crossings will have the following requirements, as needed, to protect water quality and meet BMPs:
  - Filter-fabric fences will be installed downstream prior to and during culvert installation.
  - Prior to any in-channel operations, diversion channels will be constructed and lined with plastic to divert stream flow.
- Planned erosion-control measures include:
  - grade breaks on roads;
  - surface-drainage devices on roads;
  - slash-filter windrows; and
  - grass seeding.

Included in the project proposal are the following pertinent recommendations of the *Flathead Basin Forest Practices, Water Quality and Fisheries Cooperative Program Final Report, June 1991.*

The following numbers correspond to the numbering of recommendation items contained within the aforementioned document, included in pages 154-162 of the *Final Report.*

1. BMPs are incorporated into the project design and operations of the proposed project.

2. Riparian indicators will be considered in the layout of the harvest units.

3. Management standards of the SMZ are used in conjunction with the recommendations of the study.

4. The BMP audit process will continue. This sale will likely be reviewed in an internal audit and may be randomly chosen as a State-wide audit site.

7. SMZs would be evaluated as part of the audit process.

12. Watershed-level planning and analysis are completed. Logging plans of other agencies and private companies are used.

14. DNRC is cooperating with DFWP on the further study of fish habitat and populations for Goat and Squeezer creeks.

15. DNRC will use the best available methods for logging and road building for this project.

16A. Existing roads are fully utilized for this proposal and brought up to BMP standards.

16B. DNRC utilizes BMPs, transportation planning, and logging system design to minimize new road construction.

17. DNRC contracts with DFWP to obtain species composition, spawning inventory, and spawning habitat quality for Goat and Squeezer creeks. DNRC's mitigation plan for roads fits all recommendations for "impaired" streams. Using "worst-case-scenario" criteria provides for conservative operations in this proposal.

18. Provisions in the Timber Sale Contract address BMPs, which are rigidly enforced.

20. Long-term monitoring of Soup Creek, as well as other streams on Swan River State Forest, is planned.

29-34. DNRC has cooperated with DFWP to continue fisheries work. DNRC will continue to monitor fisheries on Swan River State Forest in the future as funding allows.

GRIZZLY BEARS

- The Action Alternative would meet the intent of the SVGBCA.
- To discourage or minimize the potential for bear-human conflicts, roads and landings will be grass seeded to revegetate with plant species less palatable to grizzly bears.
- Contractors are required to haul away or store garbage in a safe place to ensure bears are not attracted to the area.
- No logging camps are allowed within the sale area.
- The Forest Officer will immediately suspend activities directly related to the proposed salvage project to prevent imminent human/grizzly bear confrontation, or confrontation between other threatened or endangered species and humans.
- Contractors are prohibited from carrying firearms onto closed roads while working under contract.
- Healthy trees not big enough to be harvested will be retained, when possible, to provide screening.

WOLVES

During implementation of this project, contract provisions protect any wolf den or rendezvous site that may be discovered within the gross sale area.

BIG GAME

The purchaser is authorized to enter the project area with motorized vehicles only for purposes related to the performance of the contract. Road use is restricted to nonmotorized transportation beyond any road closure for any other purpose. Motorized vehicle entry for purposes other than contract performance, such as hunting or transporting game animals, would be considered in trespass and prosecuted to the fullest extent of the law (*ARM 45-6-203*).

SALVAGE CRITERIA

No standing dead or dying western larch or ponderosa pine will be harvested.

Trees that meet one or more of the following requirements will be harvested:

- dead and dying Douglas-fir that have been attacked by the bark beetle;
- western white pine with a combination of red blister rust flagging in the lower two-thirds of the crown, dead tops, and poorly colored crowns (yellowing needles);
- standing or down trees that have been killed by insects or diseases; and
- damaged by wind (trees with broken tops and/or the root system is pulled out of the ground).

WILDLIFE TREES AND SNAG RETENTION AND RECRUITMENT

- DNRC would retain a minimum of 2 snags and two snag recruits over 21 inches dbh per acre. If snags or recruits over 21 inches DBH are not present, the next largest size shall be retained.
- All ponderosa pine and western larch snags will be retained.
- In addition to these retention requirements, all cull trees will be left standing. Cull ponderosa pine and western larch can be counted toward meeting the snag requirements, while other species cannot.

VISUALS

- Damaged residual vegetation will be slashed.
- The size and number of landings will be limited; the location will be away from main roads when possible.
- Disturbed sites along road rights-of-way will be grass seeded.
- When possible, healthy trees not big enough to be harvested will b e retained.

CULTURAL RESOURCES

- Operations will be suspended if cultural resources are discovered; operations may only resume when directed to do so by the Forest Officer.
- A DNRC archaeologist conducted a review of the project.

SOILS

➢ ***COMPACTION***

- Logging equipment will not operate off forest roads unless soil moisture is less than 20 percent at a depth of 6 inches, soil is frozen to a depth of at least 4 inches, or snow cover is a minimum depth of 18 inches. These conditions usually prevent soil compaction, rutting, or displacement.
- Existing skid trails and landings will be used when their design is consistent with

prescribed treatments and they meet current BMP guidelines.

- The contractor or his representative and the sale administrator will agree to a skidding plan prior to operating equipment.
- The density of skid trails in a harvest area will not exceed 20 percent of the total area in a harvest unit.

➢ ***SOIL DISPLACEMENT***

- Conventional ground-based skidding equipment will not be operated on slopes steeper than 40 percent. Soft-tracked yarding has less impact than conventional tractor skidding and would be used on slopes greater than 40 percent, but less than 55 percent. Cable yarding will be used on the steeper slopes.
- Slash piling and scarification will be completed with a dozer where slopes are gentle (less than 35 percent). In areas where soils are wet and slopes are steeper (up to 55 percent), slash treatment and site preparation will be done with an excavator.

➢ ***EROSION***

- Ground-skidding machinery will be equipped with a winchline to limit equipment operations in wet areas and on steep slopes.
- To reduce surface erosion, roads used by the purchaser will be reshaped and the ditches redefined following use.
- As needed, drain dips and gravel will be installed on roads to improve road drainage and reduce maintenance and erosion.
- Some road portions will be repaired and upgraded to standards that reduce the potential for erosion and maintenance needs.
- The prompt and timely application of certified weed-free grass seed and fertilizer will be applied to all newly constructed road surfaces and cut-and-fill slopes. This grass seed will also be applied to any existing disturbed cut-and-fill slopes and landings immediately adjacent to open roads to stabilize soils and reduce/ prevent the establishment of noxious weeds. The seeding/ fertilizing efforts will include:
  - seeding all road cuts and fills concurrently with construction;
  - applying a "quick-cover" seed mix at culvert-installation sites within 1 day of work completion; and
  - seeding all road surfaces and reseeding culvert-installation sites when the final blading is completed for each specified road segment.
- As directed by the Forest Officer, water bars, logging-slash barriers, and temporary culverts will be installed on skid trails where, based on ground and weather conditions, erosion is anticipated. These erosion-control features would be maintained and periodically inspected throughout the contract period, or extensions thereof.

AIR QUALITY

- To prevent individual or cumulative effects during burning operations, burning will be done in compliance with the Montana Airshed Group reporting regulations and any burning restrictions imposed in Airshed 2. This will provide for burning during acceptable ventilation and dispersion conditions.

- To reduce effects from burning operations:
  - Dozer, excavator, landing, and roadwork debris will be piled clean of dirt and duff to allow the piles to burn hotter and with less smoke.
  - Burning will be done in the spring or fall when ventilation is good and surrounding fuels are wet.
  - Due to high relative humidity during spring and fall, the Forest Officer may require that piles be covered. Covered piles are drier, ignite easier, burn hotter, and extinguish sooner. This will reduce dispersed unentrained smoke.
  - Large woody debris will be left in the harvest units, reducing the number of piles to burn.

SENSITIVE PLANTS

Appropriate protection measures will be taken to ensure sensitive plant populations will not be disturbed. Riparian areas near proposed harvest units will be protected by marking SMZs and isolated wetlands. No harvesting is planned in SMZs, wetlands, or near springs on localized features. If sensitive plant populations are found, the appropriate habitat area would be excluded from the harvest units.

NOXIOUS WEED MANAGEMENT

To further limit the possibilities of spreading weeds, the following mitigation measures will be implemented:

- All tracked and wheeled equipment are required to be clean of noxious weeds prior to beginning project operations. The contract administrator will inspect equipment periodically during project implementation.
- Disturbed roadside sites will be promptly seeded for revegetation. Roads used and closed as part of this proposal would be reshaped and seeded.
- Roads affected by this project may require surface blading to remove weeds before the seed-set stage.
- Weeds along roads that access the timber sale area may control weeds by applying herbicides, as designated by the forest officer.

HERBICIDES

To reduce risks to aquatic and terrestrial resources, the following would be required:

- Licensed applicators will apply all herbicides in accordance with laws, rules, and regulations of the State of Montana and Lake County Weed District.
- All applications will adhere to BMPs and the herbicide's specific label guidelines.
- Herbicide applications will not be general, but site specific to areas along roads where noxious weeds grow.
- Herbicides will not be applied to areas where relief may contribute runoff directly into surface water. All no-spray areas will be designated on the ground before applications begin.
- Herbicides will be applied on calm, rainless days to limit drift and the possibility of the herbicide moving off the road prisms.

APPENDIX B

SCOPING DOCUMENTATION

INITIAL SCOPING

The following is a list of landowners, Agency representatives, various specialists, and all interested parties that were sent an initial scoping letter on October 17, 2002.

- Jane Adams
- Brian Long,
  DNRC Inventory Section Supervisor
- Alliance for the Wild Rockies
- Jim Mann,
  Daily Interlake
- Rod Ash
- Norm Merz,
  DNRC Wildlife Biologist
- Roger Bergmeier,
  Montana Trust
- Neil Meyer,
  Swan Valley Ad Hoc Committee
- Bigfork Eagle, editor
- Arlene Montgomery,
  Friends of the Wild Swan
- Doug Mood,
  Pyramid Mountain Lumber
- Dan Bushnell,
  DNRC Information Technology Bureau
- Steve Caldbeck
- Tony Nelson,
  DNRC Hydrologist/Fisheries Biologist
- Kevin Coates,
  Wildlife Biologist
  Fish, Wildlife and Parks
- Marcia Cross,
  Tribal Historic Preservation Office
- Ann Dahl,
  Swan Ecosystem Center
- Jon Dahlberg,
  DNRC Area Manager,
  Northwestern Land Office
- Tom and Melanie Parker
- Ecology Center
- Plum Creek Timberlands,
  Clearwater Unit
- Patrick Rennie,
  DNRC Archaeologist
- William Ensign
- Scott Rumsey,
  Fisheries biologist
  Fish, Wildlife and Parks
- Gordon Sanders,
  Pyramid Mountain Lumber
- Ted Geisey,
  DNRC, Northwestern Land Office
  Trust Land Management Programs
- Randy Gordon
- Bruce Rowland,
  DNRC Supervisor State Land Management
- Gary Hadlock,
  DNRC Forest Engineer
- Pete Van Sickle,
  DNRC Forest Management Bureau Chief
- Chuck Harris,
  District Ranger,
  Swan Lake Ranger Station
- Gayle Shirley,
  Secretary of State's Office
- Pat Heffernan,
  Montana Logging Association
- Ellen Engstedt,
  Montana Wood Products Association
- Ed Tinsley,
  State Auditor's Office
- Caeser Hernandez,
  Montana Wilderness Association
- Ron Buentemeier/Tom Tintinger,
  F.H. Stoltze Land and Lumber Company
- Candace West,
  Department of Justice
- Tony M. Hulett Logging
- Kathy Bramer,
  Office of Public Instruction
- Todd O'Hair,
  Policy Advisor, Governor's Office
- Peggy Wagner,
  Montanans for Multiple Use
- Jim Krantz,
  Plum Creek Timber Company
- Stuart Lewin
- Paul Engelman,
  DNRC forest economist
- Kyle Luckow
- Donald Gee
- Steve Kelly,
  Friends of the Wild Swan
- Roger Sherman

- Tom Schultz,
  DNRC Trust Land Management
  Division Administrator
- Steve Rolfing
- Michael O'Herron,
  DNRC MEPA specialist
- Swan View Coalition
- Steve Kohler,
  DNRC Forest Entomologist
- Pat Tabor
- Ron Spoon,
  Land Management Chair, MCAFS
- Steve Funke
- Allen Branine,
  DNRC Swan Unit fire supervisor

RESPONDENTS

The following list contains individuals that responded with comments and concerns about the proposed project.

- Neil Meyer,
  Swan Valley Ad Hoc Committee
- Catherine H. Ream
- Kara McMahon
- John L. Noyes
- Swan View Coalition
- Bruce M. Whitehead,
  Principal, Hellgate Elementary School
- Jeff Juel,
  Ecology Center
- Sue Ellison,
  Bigfork Eagle
- Pat and Joanne Tabor
- Tom Tintinger,
  F.H. Stoltze Land and Lumber Company
- Arlene Montgomery,
  Friends of the Wild Swan
- Brad Borst,
  Montana Information Center
- Greg and Anne Morley
- Dick and Beverly Sherman
- Tarn Ream
- Susan G. Porrovecchio

ISSUE IDENTIFIED DURING SCOPING
The issues stated here are paraphrased to aid in summarizing alike concerns from several separate letters. The original letters are in the Big Blowdown Salvage project file.

CONCERNED ENTITY	ISSUE	WHERE ADDRESSED IN THE CEA
Sprunger-Whitney Nature Trail		
Cathy Ream (Missoula) Tarn Ream (Missoula) Kara McMahon (Missoula) John Noyes (Kalispell) Swan View Coalition (Kalispell) Bruce Whitehead (Missoula) The Ecology Center (Missoula) Friends of the Wild Swan (Swan Lake) Montana Environmental Information Center (Helena) Dick and Beverly Sherman (Swan Lake) Susan G. Porrovecchio (Bigfork)	Salvage logging in the vicinity of the Sprunger/ Whitney Nature Trail may disturb natural processes, existing forest structure, vegetation, and wildlife, reducing the educational value of the trail.	• CEA, Section 3: Alternatives Considered, Action Alternative, last bullet • CEA, Section 4: The projects anticipated effects to soil • CEA, Section 20: The project's anticipated effects on the recreational use of the trail • Appendix C - Vegetation Analysis: The project's anticipated effects to vegetation • Appendix E - Wildlife Analysis: The project's anticipated effects to wildlife
Kara McMahon (Missoula) John Noyes (Kalispell) Bruce Whitehead (Missoula) Friends of the Wild Swan (Swan Lake) Montana Environmental Information Center (Helena) Greg and Anne Morley (Swan Lake) Dick and Beverly Sherman (Swan Lake)	Salvage logging in the vicinity of the Sprunger/ Whitney Nature Trail may physically damage the trail and its interpretive signs.	• CEA, Section 3: Alternatives Considered, Action Alternative, last bullet • Appendix A - Stipulations and Specifications: Page 1, under heading of Sprunger-Whitney Nature Trail

CONCERNED ENTITY	ISSUE	WHERE ADDRESSED IN THE CEA
Economics		
The Ecology Center (Missoula)	Income from timber harvesting may not offset reduced area amenity values and their accompanying direct and indirect economic benefits to schools.	CEA, Section 24: The project's anticipated economic effects
Pat and Joanne Tabor (Soup Creek Road - Swan Valley) Stoltze Land and Lumber Company (Columbia Falls)	The lack of sustainable, commercial timber harvesting might reduce money available for schools and the number of local jobs.	• CEA, page 1, Types and Purpose of Action • CEA, Section 24: The project's anticipated economic effects
F.H. Stoltze Land and Lumber Company (Columbia Falls)	The removal of blown-down and beetle-killed trees before they decay may increase financial return to the school trust.	• CEA, page 1, Types and Purpose of Action • CEA, Section 24: The project's anticipated economic effects
F.H. Stoltze Land and Lumber Company (Columbia Falls)	At times, DNRC does not consider an alternative that produces optimum revenue while using minimum requirements within BMPs, State and Federal laws, and the SFLMP.	• CEA, Section 3: Alternatives Considered • CEA, Section 24: The project's anticipated economic effects. • Appendix A - Stipulations and Specifications
Kara McMahon (Missoula) John Noyes (Kalispell) Swan View Coalition (Kalispell) Friends of the Wild Swan (Swan Lake) Montana Environmental Information Center (Helena) Dick and Beverly Sherman (Swan Lake) Greg and Anne Morley (Swan Lake)	Friends of the Wild Swan are already compensating DNRC for the Sprunger-Whitney Nature Trail area; therefore, income from salvage logging may not offset the lost educational opportunities of not leaving the trail area in a natural state.	• CEA, page 1, Types and Purpose of Action • CEA, Section 3: Alternatives Considered, Action Alternative, last bullet. • CEA, Section 24: The project's anticipated economic effects

CONCERNED ENTITY	ISSUE	WHERE ADDRESSED IN THE CEA
Forest Health and Vigor		
Pat and Joanne Tabor (Soup Creek Road - Swan Valley) F.H. Stoltze Land and Lumber Company (Columbia Falls)	Douglas-fir and spruce bark beetles may potentially cause additional tree mortality if timber harvesting does not remove trees with existing populations of beetles.	Appendix C - Vegetation Analysis, page 16, under Forest Insects and Diseases: the project's anticipated effects to vegetation
Pat and Joanne Tabor (Soup Creek Road - Swan Valley)	If these densely overstocked stands are not thinned, the health and vigor of the stand may decrease.	Thinning for health and vigor is not one of the objectives of the proposed salvage project. However, some thinning and pruning is proposed to reduce the wildfire risk. These effects are discussed in Appendix C - Vegetation Analysis, beginning on page 14 under Fire Effects.
Increased Risk of Catastrophic Fire		
Pat and Joanne Tabor (Soup Creek Road - Swan Valley) F.H. Stoltze Land and Lumber Company (Columbia Falls)	Risk of catastrophic fire may increase in Swan River State Forest and on adjacent lands if excessive dead and down fuel is not removed and densely overstocked stands are not thinned.	Appendix C - Vegetation Analysis, page 14, under Fire Effects: the project's anticipated effects to vegetation
Wildlife		
Pat and Joanne Tabor (Soup Creek Road - Swan Valley)	Excessive down woody material and densely overstocked stands may be impeding big game movement and use of the Soup Creek area.	Appendix E - Wildlife Analysis, page 20: The projects anticipated effects to big game
Friends of the Wild Swan (Swan Lake) Montana Environmental Information Center (Helena) Tarn Ream (Missoula)	The use of mature forest habitat by wildlife may decline if salvage logging removes dead and down woody material.	Appendix E - Wildlife Analysis: The projects anticipated effects to big game

CONCERNED ENTITY	ISSUE	WHERE ADDRESSED IN THE CEA
Soils		
Friends of the Wild Swan (Swan Lake) Montana Environmental Information Center (Helena)	Removal of dead and down woody material may reduce soil productivity.	• CEA, Section 4: The project's anticipated effects to soil • Appendix C - Vegetation Analysis, beginning on page 10 under Old Growth: the project's anticipated effects to vegetation; and beginning on page 14, under Fire Effects
Water Quality		
Friends of the Wild Swan (Swan Lake)	Salvage logging may degrade water quality by introducing silt and particulate organic carbon.	• Appendix D - Watershed and Hydrology Analysis: The projects anticipated effects to watershed and hydrology • Appendix F - Fisheries Analysis: The projects anticipated effects to fish
Fish Habitat		
Friends of the Wild Swan (Swan Lake)	Removal of dead and down woody material from riparian areas may degrade fisheries habitat.	• Appendix D - Watershed and Hydrology: The projects anticipated effects to watershed and hydrology • Appendix F - Fisheries Analysis: the projects anticipated effects to fish
Vegetation		
Tarn Ream (Missoula)	Salvage logging and the removal of down woody material may be detrimental to the occurrence of white trillium (*Trillium ovatum*).	Appendix C - Vegetation Analysis beginning on page 19 under Sensitive Plants: The project's anticipated effects to vegetation

APPENDIX C

VEGETATION ANALYSIS

INTRODUCTION

The following analysis provides a detailed description of the present conditions of the forest and addresses the potential effects of the proposed alternatives in relation to the following issues:

- Douglas-fir and spruce bark beetles may potentially cause additional tree mortality if timber harvesting does not remove trees with existing populations of beetles.
- The risk of catastrophic fires may increase on Swan River State Forest and adjacent lands if excessive dead and down fuel is not removed and densely overstocked stands are not thinned.
- Salvage logging and the removal of down woody material may be detrimental to the occurrence of white trillium (*Trillium ovatum*) and other sensitive plant species.
- Harvesting could remove or change the amount, distribution, and attributes of old-growth stands on Swan River State Forest.

BACKGROUND

On April 14, 2002, a strong windstorm blew down approximately 1 MMBF of live timber across 1,500 acres of Swan River State Forest. The forest also has an ongoing severe infestation of Douglas-fir bark beetles, which has caused heavy tree mortality to another 0.5 MMBF in the same area.

DNRC is required by law to establish a timber program that provides for the timely salvage of dead and dying timber that is threatened by insects, diseases, wildfires, or windthrow on State forests (*Section 77-5-207, MCA*). Under this requirement, DNRC shall, to the extent practicable, harvest dead and dying timber before there is substantial wood decay and value loss.

In 1996, DNRC adopted the SFLMP under an EIS Record of Decision and subsequent approval by the Land Board. This project is conceived and proposed in accordance with the direction provided by the SFLMP.

ANALYSIS METHODS

The SFLMP directs DNRC to take a coarse-filter, landscape-analysis approach. A course-filter approach was done in reference to effects to age class, covertypes, and old-growth timber stands. Each alternative analyzes the effects to snags, coarse woody debris, and noxious weed occurrence and distribution. Old-growth amounts, distribution, and attribute level are discussed. The data for the existing condition was from a combination of DNRC's Goat Squeezer Timber Sale Project EIS, stand-level inventory (SLI), field observation, and 77 one-fifth-acre plots within old-growth stands in the project area. Maps, SLI spreadsheets, and plot sheets used in the analysis are located in the project file.

ANALYSIS AREA

GENERAL

The analysis area is looked at on 2 scales: the Swan River State Forest management block and the project area. Each level is looked at because of the connection between them. The project is within the State forest and directly affects the timber base and other attributes at the forest-management level. Each level is important to consider

because activities at 1 scale can have influences at another scale.

- Swan River State Forest management block - Current age class, covertypes, and old-growth amounts and attributes were analyzed on the scale of the entire Swan River State Forest, based on the Swan River State Forest SLI database file.
- Project area - Within the project area, the stands proposed for harvesting are analyzed for each alternative.

Both the Swan River State Forest management block *and* the project-level analysis area will be used throughout the analyses.

The SLI database is updated on an annual basis to include information corrections discovered in the field on a stand-level basis or to cover scheduled changes where harvesting activities have taken place. This update process provides DNRC foresters with the best available data for the required analysis on proposed management activities. The Goat Squeezer Timber Sale Project EIS analysis considered ongoing and future timber sales that have not yet received a postharvest inventory; the Big Blowdown Salvage project considers and builds its effects analysis on that analysis.

THE PROJECT AREA

The area of concentrated blowdown occurred mostly east of Highway 83 over a 1,500-acre area in the northern portion of Swan River State Forest (see *FIGURE A - PROJECT AREA MAP*). The project area is mostly flat, with some short pitches up to 20 percent, and is located at elevations that range between 3,200 and 3,400 feet. The primary access to the project area is via several short segments of secondary road from Highway 83. Adjacent lands include private, Plum Creek Timber Company, and US Forest Service (USFS) ownership.

EXISTING VEGETATION

Site conditions vary depending on their geographic, physiographic, and climatic factors. These conditions include features such as:

- soil types,
- aspect,
- position on the landscape (this project is located on the valley floor)
- growing seasons, and
- moisture availability.

These variables were combined to develop the habitat-type classifications used to describe successional development and timber productivity, among other things (*Pfister et al, 1977*).

CURRENT HABITAT TYPES AND FOREST PRODUCTIVITY WITHIN THE PROJECT AREA

The most common habitat types throughout the project area are grand fir and subalpine fir, with small amounts of cedar and spruce habitat types. These sites are predominantly occupied with Douglas-fir, western larch, lodgepole pine, ponderosa pine, grand fir, and Engelmann spruce, with scattered representations of western red cedar and subalpine fir. Forest productivity is rated moderate to high on these sites.

FIRE AND FIRE HISTORY

The stand structures in Swan River State Forest have been affected by fire suppression since the 1930s. This unmeasured effect is caused by suppressing lightning-caused fires that, prior to modern intervention, would have been influenced only by weather and climatic factors. The unsuppressed fires may have resulted in stand-replacing events when wind, drought, and high temperatures combined to form high-intensity burning conditions, which still occur during summer drought periods in western Montana.

No large-scale fires in the project area have been recorded since the late 1800s, though fire scars on trees, char pieces, and encroachment of shade-tolerant species under an older dominant canopy are evidence that fire did occur in these areas. In the more recent past, smaller-scale fires, such as spot fires (e.g., 20 feet by 20 feet in size), have occurred in the project area. These fires were suppressed and not allowed to burn under natural conditions.

Habitat types have also been grouped to indicate the severity and frequency of wildfires that historically may have occurred on a site (*Fischer and Bradley, 1987*). The majority of the proposed salvage areas are in Fire Group 11(74 percent); the remainder is in Fire Group 9 (26 percent).

Fire Group 11, which is described as warm, moist grand fir, western red cedar, and western hemlock habitat types, is the dominant fire regime in the project area.

Stand-replacing fires are estimated to have occurred every 50 to 200 years. Less severe fires likely occurred more often and in broad locations, which would have helped maintain relict seral stands. Relict stands contain large trees that have survived fires of lower intensity; these rarely develop into true shade-intolerant stands due to the low frequency of fires.

Fire Group 9 is a moist, lower elevation, subalpine fir habitat type. Past studies show an average fire-free interval of 30 years, with extremes of 10 to 100 years. The dominant representation of ponderosa pine, western larch, and Douglas-fir may account for the high fire frequency. Due to the moisture content of these stands, moderate to severe fires may have been restricted to brief periods in the summer. Flare-ups may have caused openings that could have allowed the establishment of seral species.

PAST MANAGEMENT ACTIVITIES

Inventory records show that past timber harvesting in the project area began in the early 1950s. The following information pertains to timber sales in, and adjacent to, the Big Blowdown Salvage Project area between 1950 and 2002:

- Most past harvesting in the project area has occurred in the flatter areas east of Highway 83 at the base of the Swan Range. Between 1950 and 1970, regeneration harvests were conducted in harvest units 20 acres and larger. Most of the sale units have regenerated and are well stocked with a variety of sapling-/pole-sized tree species. Seedtree and clearcut harvesting between 1970 and 1992 have created 10- to 150-acre openings that have densely regenerated with 6- to 40-foot trees. Since the 1950s, ongoing salvage harvesting has also taken place throughout the areas of low elevation.
- Stands in the valley bottom were harvested primarily with clearcut/seedtree prescriptions beginning in the 1950s. These stands have regenerated to a variety of species that include ponderosa pine, western larch, Douglas-fir, western red cedar, western white pine, and grand fir. The 15- to 30-foot-tall regeneration is well-stocked to overstocked in most stands.
- Timber harvesting on adjacent Plum Creek Timber Company land is ongoing. Most stands have been harvested using a variety of treatment methods. Clearcut, seedtree, and selective harvest methods have typically been applied to hundreds of contiguous acres, creating abrupt, straight edges that follow ownership boundaries along section lines.

- Many salvage operations have taken place over several years and have reduced the number of large, sound snags across both the project area and Swan River State Forest. In stands of past salvage operations, the number and species composition of large snags have changed. The removal of snags also affected the structure of the snag component.

VEGETATION COURSE-FILTER ANALYSIS

COVERTYPE REPRESENTATIONS

The current covertype distributions within the project area and across Swan River State Forest are displayed in *TABLE C-1 - COVERTYPE DISTRIBUTION BY ACRES AND PERCENT OF TOTAL ACRES*. This table is based on the cumulative-effects analysis for covertypes in the Goat Squeezer Environmental Impact Statement.

TABLE C-1 - COVERTYPE DISTRIBUTION BY ACRES AND PERCENT OF TOTAL ACRES

COVERTYPE	PROJECT AREA		SWAN RIVER STATE FOREST	
	ACRES	% OF TOTAL ACRES	ACRES	% OF TOTAL ACRES
Western white pine	591	41	3,826	10
Ponderosa pine	100	7	2,519	7
Western larch/ Douglas-fir	93	6	8,920	24
Douglas-fir	0	0	480	1
Lodgepole pine	3	<1	2,175	6
Subalpine fir	7	<1	3,446	9
Mixed conifer	657	45	16,132	43
Hardwoods	0	0	21	<1
Nonforested acres such as surface water, wetlands, or stands that have not yet fully regenerated after harvesting are not included.				

Direct and Indirect Impacts to Covertypes

- ***Direct and Indirect Impacts of the No-Action Alternative to Covertypes***

  Wind damage and disease mortality are random events. While large areas have little damage or mortality, 1- to 2-acre patches of concentrated damage and mortality are scattered throughout the salvage area. On average, approximately 7 or 8 trees per acre have blown down and approximately 5 standing trees per acre have died. These stands still retain 100 to 150 live trees per acre. Because so few trees per acre have blown down or died, the stand composition has probably not been changed by these natural events.

  Shade-tolerant trees would continue to regenerate under closed-canopy forests. The long-term covertype effects would see a change to an overstory dominated by shade-tolerant species; thus, the covertype classification would change to the dominant species in the next successional stage of the stand.

  As stands age over time, natural forest succession and fire suppression would reduce the variability of covertypes on the landscape.

- ***Direct and Indirect Effects of the Action Alternative on Covertypes***

  Since the trees planned for removal were already killed by a natural event, stand covertype composition would not change beyond what has occurred naturally.

Cumulative Impacts to Covertype

- ***Cumulative Effects of the No-Action Alternative on Covertypes***

  Douglas-fir bark beetle brood trees would not be removed. This may cause increased Douglas-fir mortality over large areas. Covertypes may shift as Douglas-fir fades from the overstory and is replaced by other shade-tolerant species.

- ***Cumulative Effects of the Action Alternative on Covertypes***

  The removal of Douglas-fir bark beetle brood trees may reduce

tree mortality, allowing Douglas-fir to persist in the overstory. Covertype shifts to other shade-tolerant species may be slower over time as Douglas-fir remains a component of the overstory longer.

AGE-CLASS DISTRIBUTION

Current age-class distributions within the project area and across Swan River State Forest are displayed in *TABLE C-2 - AGE-CLASS DISTRIBUTION BY ACRES AND PERCENT OF TOTAL ACRES*. This table is based on the cumulative effects analysis for age class in the Goat Squeezer Environmental Impact Statement.

TABLE C-2 - AGE-CLASS DISTRIBUTION BY ACRES AND PERCENT OF TOTAL ACRES

AGE CLASS IN YEARS	PROJECT AREA		SWAN RIVER STATE FOREST	
	ACRES	% OF TOTAL ACRES	ACRES	% OF TOTAL ACRES
0-39	485	31	8,150	21
40-99	50	3	6,515	17
100-149*	67	4	6,659	17
150 +**	963	62	17,224	45

Nonforest acres, such as surface water and wetlands, are not included.
**Lodgepole pine covertype is 100 to 139 years old*
***Lodgepole pine covertype is 140+ years old*

Direct and Indirect Impacts to Age Class

- ***Direct and Indirect Effects of the No-Action Alternative on Age Class***

  Wind damage and disease mortality are random events. While there are large areas with little damage or mortality, 1- to 2-acre patches of concentrated damage and mortality are scattered throughout the salvage area. On average, approximately 7 or 8 trees per acre have blown down and approximately 5 standing trees per acre have died. These stands still retain 100 to 150 live trees per acre. Because so few trees per acre have blown down or died, the age-class composition has probably not been changed by these natural events.

  Unless a large disturbance, such as a wildfire, occurs, the age-class distribution is not likely to change in the near future.

  As stands age over time, natural forest succession and fire suppression would reduce the variability of age classes on the landscape.

- ***Direct and Indirect Effects of the Action Alternative on Age Class***

  Since the trees planned for removal were already killed by a natural event, stand age classes would not change beyond what has occurred naturally.

Cumulative Impacts to Age Class

- ***Cumulative Effects of the No-Action and Action Alternatives on Age Class***

  Cumulative effects to age class are not anticipated. Mortality caused by the Douglas-fir bark beetle would not likely change stand age-class distribution over time.

CANOPY COVERAGE

The combination of overstory and understory tree canopy coverage averages 70 percent or greater for stands older than 39 years within the project area.

Direct and Indirect Impacts to Canopy Coverage

- ***Direct and Indirect Impacts of the No-Action Alternative to Canopy Coverage***

  Wind damage and disease mortality are random events. While there are large areas with little damage or mortality, 1- to 2-acre patches of concentrated damage and mortality are scattered throughout the salvage area. On average, approximately 7 or 8 trees per acre have blown down and approximately 5 standing

trees per acre have died. These stands still retain 100 to 150 live trees per acre. Because so few trees per acre have blown down or died, the stand canopy coverage has probably not been changed by these natural events.

In the short term, the canopy coverage would not be changed by the No-Action Alternative. Natural disturbances over time would cause mortality to individual trees and groups of trees, which would result in variable changes to canopy coverage as trees die and are replaced.

- ***Direct and Indirect Impacts of the Action Alternative to Canopy Coverage***

  Since the trees planned for removal were already killed by a natural event, stand canopy coverage would not change beyond what has occurred naturally.

Cumulative Impacts to Canopy Coverage

- ***Cumulative Impacts of the No-Action Alternative to Canopy Coverage***

  The brood trees for Douglas-fir bark beetles would not be removed, which may cause increased Douglas-fir mortality over large areas. As Douglas-fir fades from the overstory, canopy coverage may shift to other shade-tolerant species.

- ***Cumulative Impacts of the Action Alternative to Canopy Coverage***

  The proposed action would remove brood trees for Douglas-fir bark beetles, which may reduce tree mortality and allow Douglas-fir to persist in the overstory, maintaining canopy coverage.

FRAGMENTATION

Historically, forest fires burning with various frequencies and intensities created the patterns and edges associated with forest patch size and shape. This resulted in a forest patchwork of various age classes and stands of a variety of sizes and shapes. Since the advent of fire suppression and logging activities, the primary agent of patch development has been forest management and human developments. Intense fires during severe fire seasons still influence patch development, but the frequency of low-intensity fires and ignition sources for large fires is greatly reduced.

Swan River State Forest and adjoining properties display this pattern of fire-generated patches overlain by human-generated patches of logging units and land clearing. Past logging units often were designed in regular geometric patterns, usually ranging from 20 to 100 acres. When viewed from above, these patches created an unnatural-looking mosaic across the landscape. These past harvest units have been characterized as an unnatural "fragmentation" of the normal forest condition; however, the natural stand boundaries show that past landscapes were highly variable and fragmented by fire and other influences. More recent harvesting on neighboring industrial private ownerships has followed property boundaries, making a checkerboard pattern of 300- to 640-acre patches. Past harvest openings on these ownerships have utilized both even-aged regeneration harvesting (seedtree and clearcutting) and uneven-aged harvesting (individual-tree selection and group selection).

Swan River State Forest's SLI database shows that timber stands are delineated along natural and human-generated boundaries. The natural boundaries fall along edges of moisture regimes, age classes, soil types, topographic features, and fire influences that created visible differences in timber-stand characteristics. The human-generated boundaries follow property boundaries, natural boundaries, and past harvest areas. The stand size

is variable, depending on location, and ranges from 5 to several hundred acres. In the project area, stand sizes reflect both past harvesting and large fires that burned prior to European settlement.

Direct and Indirect Impacts to Fragmentation

- ***Direct and Indirect Impacts of the No-Action Alternative to Fragmentation***

  Concentrated mortality and blowdown have created some small 1- to 2-acre openings. Timber harvesting on adjacent ownerships and forest fires would continue to change existing patterns and edges associated with forest patch size and shape.

- ***Direct and Indirect Impacts of the Action Alternative to Fragmentation***

  Only 8 or 9 trees per acre would be removed with this project; therefore, no change is anticipated to existing patterns and edges associated with forest patch size and shape.

Cumulative Impacts to Fragmentation

- ***Direct and Indirect Impacts of the Action Alternative to Fragmentation***

  Timber harvesting on DNRC and adjacent ownerships and forest fires would continually change existing patterns and edges associated with forest patch size and shape.

OLD GROWTH

Current Situation and Distribution of Old Growth

DNRC is enjoined from harvesting in old-growth stands on timber sales that were named in Judge Sherlock's ruling. The Department is also enjoined from using the 1998 biodiversity guidance for developing new timber sale projects. Administrative rules have been developed and finalized for DNRC's old-growth management. The SFLMP was used to develop this CEA, including old-growth management.

DNRC defines old growth based on the number and size of large trees according to the minimums proposed by *Green et al (1992)*. The SLI provides the data for labeling stands as old growth. At the project level, stands identified as old growth through the SLI are verified through additional field reconnaissance, including the collection of plot-level data. A representation of old-growth stands within the project area where salvaging is proposed *is demonstrated in FIGURE C-1 - STANDS THAT MEET THE GREEN ET AL DEFINITION FOR OLD GROWTH.*

Several approaches to estimating historic, or naturally occurring, old-growth amounts have been explored. Previous efforts to estimate amounts of old growth that historically occupied the landscape in Swan Valley include:

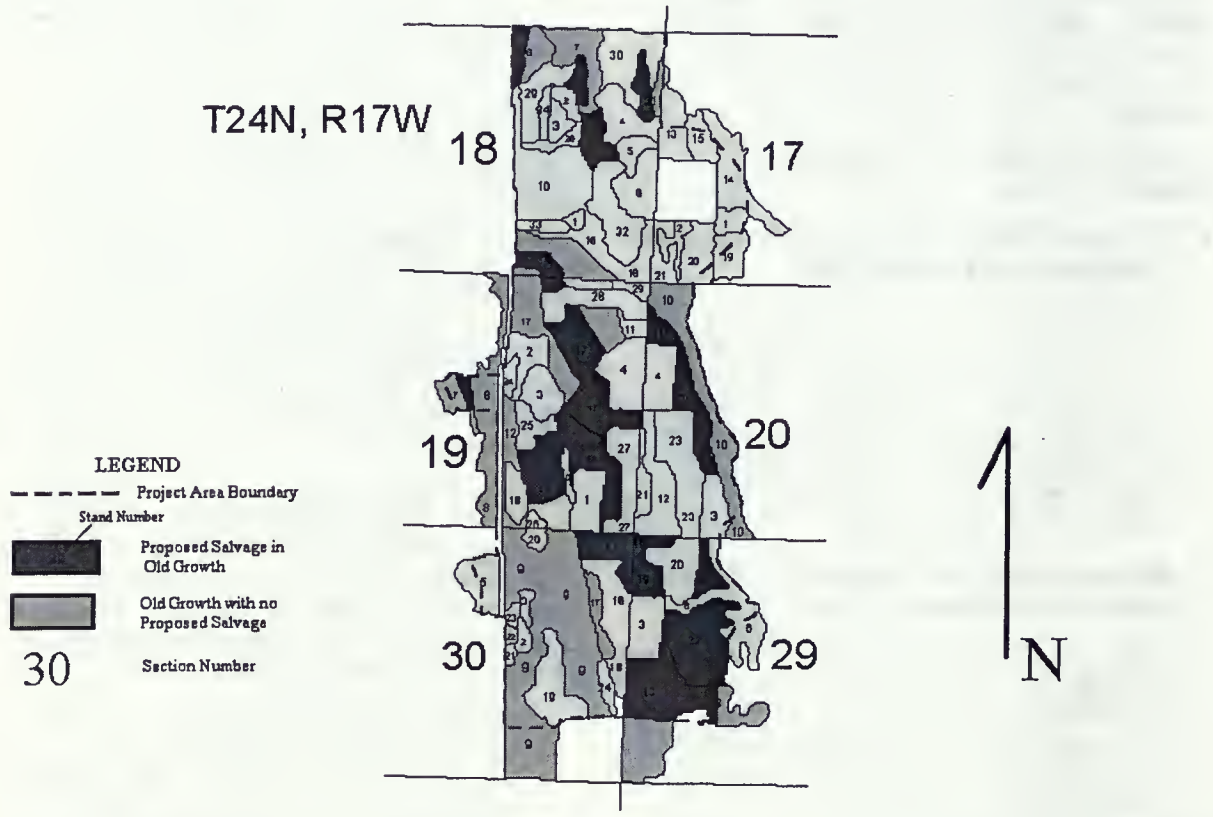
- The *FNF Plan Amendment 21 (1998)* estimated 29 percent of the Flathead Basin was occupied by late seral age classes. This estimate was interpreted from a timber survey done in 1898 and 1899 by *H.G. Ayres.*

- *Lesica (1996)*, in an effort to use fire history to estimate the proportions of old-growth forests in Swan Valley, estimated that approximately 52 percent of the area was occupied by stands that were 180 years or older.

- Using covertype conditions and historical data from the 1930s, summarized by *Lozensky (1997)*, an estimated 29 percent of the forested acres on Swan River State Forest would have historic conditions occupied by old growth (*SOUTH FORK LOST CREEK SEIS, 1998*)

- *Hart (1989)* indicated that approximately 48 percent of the area contained in the 1930s stand data for Seeley and Swan valleys had forests with a significant component of trees older than 200 years.

FIGURE C-1 - STANDS THAT MEET THE GREEN ET A DEFINITION FOR OLD GROWTH



Based on the above estimates, the amount of naturally (historically) occurring old growth in Swan River State Forest could range from 29 to 52 percent.

About 34 percent (12,626 acres) of forested acres in Swan River State Forest are identified as old growth. Approximately 672 acres of the project area is old growth.

Analysis Methods

DNRC uses criteria from *Green et al* to define old growth. The definition sets minimum thresholds for the number and size of large trees based on habitat type and covertype for labeling a stand as old growth. According to information in the SLI database, many stands have been identified as old growth. As part of the field reconnaissance for this project, stands labeled as old growth in the SLI database, or those in question, were field checked to verify that they met the *Green et al* definition.

Old-Growth Attributes within the Project Area

Background

Because the old-growth definition only identifies old-growth stands, but does not classify them further, DNRC has developed an index of 'old growthedness' based on SLI data that further describes old-growth-stand attributes. This index is called the Full Old Growth Index (FOGI). For this analysis the index will be used to display changes to old-growth stands.

Methods

Attribute levels for old-growth stands on Swan River State Forest were assessed using FOGI. Since old-growth acres would not be changed, this analysis displays how attribute levels would be affected by each alternative.

The primary purpose of FOGI is to describe the status of old growth on DNRC lands and provide a link to naturally occurring amounts and conditions of old growth. The FOGI index is a means to measure old-growth characteristics based on a point system for physical attributes that are often associated with stands in the latter stages of development. Points are assessed in the following categories:

- large live trees per acre,
- coarse woody debris,
- snags per acre,
- decadence,
- stand structure,
- volume per acre, and
- canopy cover.

The total points available for a stand varies by covertype, and point ranges, are further grouped into low, medium, or high old-growth attributes.

TABLE C-3 - FOGI CLASSIFICATIONS FOR SWAN RIVER STATE FOREST AND THE BIG BLOWDOWN PROJECT AREA displays the FOGI classifications for the Swan River State Forest and project area.

Direct and Indirect Impacts to Old Growth

- ***Direct and Indirect Impacts of the No-Action Alternative to Old Growth***

  The current amount, character, and distribution of old-growth stands would remain the same within the project area for the short term. In the long term, existing old growth would continue to age and become more decadent. Some stands may drop out of the old-growth classification because Douglas-fir bark beetles are killing sufficient trees to reduce the number of large live trees below the minimum trees per acre described in *Green et al.*

  Not harvesting in old-growth stands would continue the existing risk of stand-replacement-type fires that would likely consume portions of the old-growth stands in their path.

  Existing open roads would continue to provide access to firewood gatherers, reducing the development of snags and coarse woody debris on those sites.

  Over time and barring large-scale disturbances, FOGI classification levels would increase on most covertypes as climax species mature, decadence increases, and trees die and fall, creating more snags and large woody debris. Eventually these same stands would also reach a point where the FOGI classification would begin to decrease because the decreasing number of large live trees reduces the point value of the FOGI. If enough large trees die, the stand would no longer meet the old-growth definition.

- ***Direct and Indirect Impacts of the Action Alternative to Old Growth***

  This action proposes to salvage trees in 358 acres of classified

TABLE C-3 - FOGI CLASSIFICATIONS FOR SWAN RIVER STATE FOREST AND THE BIG BLOWDOWN PROJECT AREA

ANALYSIS AREA	ACRES OF LOW ATTRIBUTE LEVELS	ACRES OF MEDIUM ATTRIBUTE LEVELS	ACRES OF HIGH ATTRIBUTE LEVELS	TOTAL ACRES
Swan River State Forest	94	3,996	8,536	12,626
Big Blowdown Project Area	0	208	464	672
Old Growth where salvage occurs	0	189	169	358

old growth within the project area. Plots in old-growth stands identified for salvage harvesting indicate that, on average, there are still just over 15 live trees per acre with a dbh greater than 21 inches, despite the blow down and Douglas-fir bark beetle damage. This proposal would only remove down and some dead standing material, not changing the amount and distribution of existing old-growth stands.

FOGI attribute levels are not anticipated to change in old-growth stands affected by the Action Alternative. While the individual categories making up the FOGI would be affected by salvaging, the small amount of change would not reduce the overall attribute level enough to change the existing classification of high, medium, or low. The expected changes to old-growth attributes include:

- The proposed action would remove Douglas-fir bark beetle brood trees, possibly reducing Douglas-fir mortality, which may allow Douglas-fir to persist and grow into larger trees.
- The proposed action would remove 7 to 8 blown-down trees per acre. Some 1- to 2-acre areas where blowdown damage is concentrated would have higher numbers of trees removed. These trees would be unavailable for future down woody material.
- Approximately 1 standing tree per 2 acres would be removed if they have recently died or are dying from insect or disease attacks. Some of these trees are over 21 inches dbh. No dead or dying western larch would be removed. Some 1- to 2-acre openings may be created due to concentrated blowdown or mortality. The trees removed would not be unavailable for future snags or large down woody material. Approximately 4.7 snags per acre would be left, of which 2.4 snags per acre would have a dbh greater than 21 inches.

Mature stands not yet classified as old growth could be considered old growth in the future as they age and grow. Salvage harvesting within these stands would reduce some old-growth attribute levels, particularly the number of large snags and amount of coarse woody debris, as well as potentially decrease stand decadence.

Cumulative Impacts to Old Growth

- ***Cumulative Impacts of the No-Action and Action Alternatives to Old Growth***

  General site characteristics and past road construction, timber harvesting, and wildfires have led to the current amount of old growth and attribute level in the entire area. Future salvage harvesting will not likely alter the old-growth designation, but will continue to reduce some old-growth attribute levels, particularly the number of large snags and amounts of coarse woody debris and stand decadence. Future sales and thinning projects would likely continue to take place in the analysis area. If additional management projects were proposed, the MEPA process would be implemented.

FIRE EFFECTS

Fire History

Swan River State Forest

The fire regimes across Swan River State Forest are variable. Different fire frequencies and intensities have developed a mosaic pattern across the forest as a whole. Areas of frequent fire have produced a Douglas-fir, western larch, and ponderosa pine covertype with representations of lodgepole

pine and western white pine. As fire intervals become longer, the more shade-tolerant species (grand fir, subalpine fir, Engelmann spruce, western hemlock, western red cedar) begin to develop. The higher elevations have longer periods between fires within the forest; these stands are multistoried with a dominant shade-tolerant covertype. Where periods of time between fires were short, the stands are open and single-storied, occasionally two-storied. Fire suppression has begun to change covertypes and fire frequency. Stands of ponderosa pine, western larch, and/or Douglas-fir have become multistoried with shade-tolerant species. Once open, stands dominated by ponderosa pine now have a thick understory of Douglas-fir. Fires that occur are generally kept small, limiting the effects of natural fires. In stands where fire intervals have been lengthened, a larger-scale fire would burn more intensely due to ladder fuels and heavy fuel accumulation

Big Blowdown Project Area

The project area is represented by 2 different fire regimes that are classified as fire groups: Fire Group 11 and Fire Group 9 (listed in descending order of representation).

Typically, fires burned in the project area at intervals of 30 years to as long as 200 years or greater. The various fire intervals and intensities created a mosaic in the forest across the project area.

Hazards and Risks in the Project Area

A potential loss of timber resources, effects to watersheds, and loss of property are among the hazards and risks associated with wildfires. Hazards in most mature stands are at near-natural levels, with moderate to high accumulations of down and ladder fuels relative to the high tree-stocking levels. Many of the mature stands are approaching the upper end of the fire-free interval of 200 years. This long fire-free interval has allowed continued encroachment of shade-tolerant trees, down woody-debris accumulations, and mortality-increasing catastrophic fire risks.

Much of the adjacent Plum Creek Timber Company ownership has been harvested in recent years; the resulting stands have a low wildfire risk due to light fuel loading.

Direct and Indirect Impacts to Fire Effects

- ***Direct and Indirect Impacts of the No-Action Alternative to Fire Effects***

  The hazards of wildfires would not change substantially in the short term. With continued accumulation of fine fuels, snags, ladder fuels, and dead-wood components, the risk of a stand-replacement fire would increase.

- ***Direct and Indirect Impacts of the Action Alternative to Fire Effects***

  The proposed salvage would remove 7 to 9 trees or 7 to 8 tons per acre of large woody fuel material. Treated areas would see a reduced fire hazard. Pockets of dead and dying trees would be removed, which would reduce the chance for a flare-up. Immediately following the salvage harvesting, the amount of fine, flashy fuels would increase. Scattering slash, cutting limbs and tops to lay low to the ground to hasten decomposition, and yarding to landing piles and burning would reduce fire hazards.

  Some postsalvage machine piling and scarification would take place in areas of concentrated blowdown and disease mortality just south of Point Pleasant Campground and north of the Soup Creek Road/ Highway 83 intersection. Piling would remove the down woody fuel buildup in excess of 20 tons per acre and promote the natural

regeneration of shade-intolerant species where overstory canopies have thinned.

Some understory trees around a private residence just north of Soup Creek Road would be thinned and pruned; limbs would be hand piled and burned. This treatment would remove ladder fuels and attempt to reduce the likelihood of a crown fire adjacent to the residence, which could result in the catastrophic loss of that residence.

Cumulative Impacts to Fire Effects

- ***Cumulative Impacts of the No-Action Alternative to Fire Effects***

  The risk of stand-replacing wildfires in historically nonlethal regimes would continue to increase as a result of forest fuel acummulation.

- ***Cumulative Impacts of the Action Alternative to Fire Effects***

  Fuel loadings would be reduced in stands that are treated, which would decrease wildfire risks in these specific areas.

FOREST INSECTS AND DISEASES

Analysis Methods

Swan River State Forest is observed from the air annually and insect and disease problems are mapped. DNRC and USFS provide a report of the aerial reconnaissance with updates on insect and disease trends across the Inland Northwest. In addition to investigating these reports, DNRC personnel include their own observations of additional forest health conditions as they occur on Swan River State Forest.

Analysis Area

Primarily, the analysis area is the Big Blowdown Salvage Project area.

The forest productivity, structure, and composition within the project area are currently being affected by white pine blister rust (*Cronartium ribicola*) and the Douglas-fir bark beetle (*Dendroctonus pseudotsugae*). Other insects and diseases are present in the project area, but are not a serious problem at this time.

➢ White pine blister rust

White pine blister rust, caused by the introduced pathogen *Cronartium ribicola*, is the primary cause for the reduction of western white pine in the forest covertypes in which it historically occurred across the project area. Western white pine of all ages and sizes can be infected and killed by white pine blister rust. The western white pine that remain alive on Swan River State Forest do so because either they possess natural genetic resistance to the rust disease or they are susceptible and have not yet become infected. Western white pine are also very susceptible to attacks by the mountain pine beetles, even when they are relatively isolated individual trees in stands of mixed conifer.

Western white pine produces high-value sawlogs that average $446 per MBF (*University of Montana 2001*). Western white pine harvested under Stillwater State Forest's Werner/Taylor Timber Sale Project area and 1999 Salvage Permit averaged $300 per MBF. Trees infected by white pine blister rust often have dead tops that reduce its volume and value as a sawlog. This species is also highly favored by firewood cutters.

Management and restoration recommendations for western white pine emphasize planting rust-resistant western white pine seedlings and maintaining white pine genetic diversity (*Fins et al. 2001*).

Monitoring for rust levels should be performed at various times in the life of a stand; bole pruning to reduce the chances of blister

rust infections may be required if rust levels are high when the trees are still young. Retention of various numbers of natural, mature, seed-bearing western white pine is encouraged in order to maintain genetic diversity of the species (*Schwandt and Zack 1996*).

➢ Douglas-fir bark beetle

The Douglas-fir bark beetle is currently active across Swan River State Forest. The project area has a high incidence of Douglas-fir bark beetle in the areas proposed for salvaging. In general, stands that are at highest risk to attack by the Douglas-fir bark beetle are those with:

- a stand basal area greater than 250 square feet,
- an average stand age greater than 120 years,
- an average Douglas-fir dbh over 14 inches,
- a stand composition greater than 50 percent Douglas-fir (*USDA Forest Service 1999*), and
- stands with recent Douglas-fir and western larch blowdown.

Due to age, stocking levels, and recent blowdown, the Douglas-fir within most of the proposed harvest areas on the Big Blowdown Salvage Project area are at high risk of Douglas-fir bark beetle attack. Higher populations of Douglas-fir bark beetles tend to exist in fresh blowdown, fire-killed trees, or live trees within and around pockets of root disease. Management of Douglas-fir bark beetles should concentrate on the removal of wind-thrown Douglas-fir and the salvage of newly attacked trees before adult beetles can emerge (*Livingston 1999; Schmitz and Gibson 1996*). Valuable Douglas-fir (those in and around campgrounds, for example) that are considered to be at high risk of attack can be protected by use of the Douglas-fir bark beetle antiaggregant pheromone 3-methylcyclohex-2-en-1-one (MCH) (*Ross et al. 2001*).

In 1999, numerous pockets of infestations were located within the analysis area. Each spring following the flight of the beetle, reconnaissance surveys were conducted by DNRC foresters to determine the extent of the infestations. The Douglas-fir bark beetle has caused heavy Douglas-fir mortality on an estimated 2,500 acres. The Swan River State Forest timber permit program allowed for the salvage harvesting of approximately 2 MMBF of sawlogs in 1999, 600 thousand board feet (MBF) in 2000, 500 MBF in 2001, and 600 MBF in 2002.

Direct and Indirect Impacts to Forest Insects and Diseases

- ***Direct and Indirect Impacts of the No-Action Alternative to Forest Insects and Diseases***

  Sawlog volume would continue to be lost from the project area due to insect and disease effects, especially from Douglas-fir bark beetles in inaccessible stands with large trees. Salvage logging would continue where stands are accessible without building roads.

  School trusts may lose long-term revenue due to:

  - the slowly increasing mortality rates and increased sawlog defect that are caused by a slow increase in incidences of blister rust and bark beetles and
  - the reduced growth rates as old-growth stands continue to age and defects increase.

- ***Direct and Indirect Impacts of the Action Alternative to Forest Insects and Diseases***

  The salvage treatments would remove dead and dying trees affected by insects and diseases. Snags meeting DNRC density guidelines would be retained.

The proposed action would remove dying Douglas-fir trees that have active broods of bark beetles. This may limit mortality in the remaining healthy trees by reducing beetle populations and preventing successful attacks and allow Douglas-fir to persist in the overstory.

Cumulative Impacts to Forest Insects and Diseases

- ***Cumulative Impacts of the No-Action Alternative to Forest Insects and Diseases***

  No harvesting of dead or dying trees would occur; therefore, forest stands would continue to experience insect and disease mortality, and fuel loading would continue to increase. The current forest conditions would continue.

- ***Cumulative Impacts of the Action Alternative to Forest Insects and Diseases***

  In general, timber-management activities on Swan River State Forest have used harvest prescriptions to reduce losses and recover mortality due to insects and diseases. Continued salvage harvests would focus on lowering the incidence of insect infestations and disease infections and reducing the risk of stand-replacement fires.

SENSITIVE PLANTS

Existing Condition and Analysis Methods

The Montana Natural Heritage Program database was searched in January 2003 for plant species and related features of special concern in the vicinity of Big Blowdown Salvage Project area. Results of this search were then compared to the proposed harvest sites for potential direct and indirect impacts of the proposal. Mitigation measures would be developed, if needed.

All sensitive plants and their related habitat features were found in wet meadows, fens, and riparian areas; these areas are not normally classified as forest stands or considered for timber-harvesting activities. Only 6 plant species were found within the project area; 5 are associated with fens, and 1 with a riparian area.

Concern was raised about the proposed project's effects on the white trillium (*Trillium ovatum*). The white trillium is likely to occur in moist forested areas within the project area and may occur in abundance during years of high precipitation (*Shaw and On 1979*). The white trillium is not listed as rare, endemic, disjunct, threatened, or endangered in the project area by the Montana Natural Heritage Program.

Direct and Indirect Impacts to Sensitive Plants

- ***Direct and Indirect Impacts of the No-Action Alternative to Sensitive Plants***

  Annual seasonal climatic variations and events like drought, flooding, trees blown down across streams, and beaver activity could alter water levels in wet areas, leading to increases or decreases in localized plant populations. Otherwise, there would be no effects to sensitive plants.

- ***Direct and Indirect Impacts of the Action Alternative to Sensitive Plants***

  Sensitive plants associated with wetlands would not be directly affected by harvesting operations.

  Some white trilliums may be injured during skidding operations. The white trillium is not considered sensitive within Swan River State Forest, and the overall population of trillium is not expected to change within the project area.

  Given the level of proposed harvesting for this project, no measurable changes in water yield or surface-water levels are anticipated from either proposed

action alternative. Mitigation measures to prevent erosion and sediment delivery would ensure no change in nutrient levels would occur. Therefore, no indirect effects to the population levels of sensitive plants are expected.

Cumulative Impacts to Sensitive Plants

- ***Cumulative Impacts of the No-Action and Action Alternatives to Sensitive Plants***

  If changes in water yield or nutrient levels occur, sensitive plant populations may, in turn, be affected. Given the level of the proposed and active harvesting on Swan River State Forest and other land in the project area, no measurable changes in water yield or surface water levels are anticipated from the proposed action alternative. The application of mitigation measures to prevent erosion and sediment delivery would ensure that no change in nutrient levels would occur.

NOXIOUS WEEDS

Existing Condition

Spotted knapweed (*Centaurea mauclosa*) and common St. Johns-wort (*Hypercium perforatum*) populations have become established along road edges within the project area. Swan River State Forest has begun a program to reduce the spread and occurrence of noxious weeds.

Direct and Indirect Impacts to Noxious Weeds

- ***Direct and Indirect Impacts of the No-Action Alternative to Noxious Weeds***

  Noxious weed populations would continue as they exist. Weed seed would continue to be introduced by recreational use of the forest and logging activities on adjacent ownerships. Swan River State Forest may initiate spot spraying under the FI program to reduce the spread of noxious weeds along roads.

- ***Direct and Indirect Impacts of the Action Alternative to Noxious Weeds***

  Logging disturbance would provide opportunities for noxious weeds to establish; log trucks and equipment would introduce seeds from other sites. Occurrences and the spread of noxious weeds would be reduced by mitigation measures designed to apply integrated weed-management techniques. Grass seeding of new and disturbed roads and landings and spot spraying of new infestations would reduce or prevent the establishment of new weed populations. Requiring machinery to be washed and inspected prior to entering the project area would reduce the introduction of noxious weed seeds into the forest. Roadside herbicide spraying would reduce existing noxious weed populations. All herbicide spraying would be strictly controlled to follow label directions, prevent introduction of chemicals into riparian systems, and target only the intended noxious weed species.

Cumulative Impacts to Noxious Weeds

- ***Cumulative Impacts of the No-Action and Action Alternatives to Noxious Weeds***

  This proposed action alternative, together with other management and recreational activities on Swan River State Forest and adjacent lands, would provide an opportunity for the transfer of weed seeds from various sites and an increased establishment of noxious weeds. Prevention actions through the County Weed Board and active weed-management activities would be used to reduce the spread and establishment of noxious weeds and the resulting replacement of natural vegetation. Swan River State Forest would continue to provide some level of weed management through this action and with other management programs.

APPENDIX D

WATERSHED AND HYDROLOGY ANALYSIS

INTRODUCTION

SEDIMENT DELIVERY

Timber harvesting and related activities, such as road construction and site preparation/ scarification, can lead to water-quality impacts by increasing the production and delivery of fine sediment to streams. Construction of roads, skid trails, and landings can generate and transfer substantial amounts of sediment through the removal of vegetation and exposure of bare soil. In addition, removal of vegetation near stream channels reduces the sediment-filtering capacity and may reduce channel stability and the amounts of large woody material. Large woody debris is a very important component of stream dynamics, creating natural sediment traps and energy dissipaters to reduce the velocity and erosiveness of stream flows.

WATER YIELD

Timber harvesting and associated activities can affect the timing, distribution, and amount of water yield in a harvested watershed. Water yields increase proportionately to the percentage of canopy removal, because removal of live trees reduces the amount of water transpired, leaving more water available for soil saturation and runoff. Canopy removal also decreases interception of rain and snow and alters snowpack distribution and snowmelt, which lead to further water-yield increases. Higher water yields may lead to increases in peak flows and peak-flow duration, which can result in accelerated streambank erosion and sediment deposition.

ANALYSIS METHODS

SEDIMENT DELIVERY

Methodology for analyzing sediment delivery will be completed using a sediment-source inventory. All roads and stream crossings were evaluated to determine sources of introduced sediment and compliance with applicable BMPs. The stability of stream channels was assessed using methods developed by *Pfankuch*. A DNRC hydrologist conducted these analyses in the fall of 2002.

WATER YIELD

An analysis of water-yield increases will not be completed for the proposed project. The project proposal involves salvaging trees killed by windthrow and forest diseases. As a result, increases in water yield have already occurred through natural processes; the proposed project would not contribute to the removal of live vegetation or subsequent increases in water yield.

ANALYSIS AREA

SEDIMENT DELIVERY

The analysis will cover all stream segments within the proposed project area and all roads and upland sites that may contribute sediment to a live stream. Portions of the project area are located within the Soup Creek watershed; the remainder of the proposal is located in small unnamed, intermittent tributaries to Swan River.

EXISTING CONDITIONS

REGULATORY FRAMEWORK

Montana Surface Water Quality Standards

According to *ARM 17.30.608 (2)(a)*, the Swan River drainage, including Soup Creek and other small tributaries, is classified as B-1. Among other criteria for B-1 waters, no increases are allowed above naturally occurring levels of sediment, and minimal increases over natural turbidity. "Naturally occurring," as defined by *ARM 17.30.602 (17)*, includes conditions or materials present during runoff from developed land where all reasonable land, soil, and water conservation practices (commonly called BMPs) have been applied. Reasonable practices include methods, measures, or practices that protect present and reasonably anticipated beneficial uses. These practices include, but are not limited to, structural and nonstructural controls and operation and maintenance procedures. Appropriate practices may be applied before, during, or after completion of potentially impactive activities.

Designated beneficial water uses within the project area include coldwater fisheries and recreational use in the streams, wetlands, and the surrounding area.

Water-Quality-Limited Waterbodies

No watersheds or streams in the proposed project area are listed in the 1996 or 2002 *LIST OF WATERBODIES IN NEED OF TOTAL MAXIMUM DAILY LOAD (TMDL) DEVELOPMENT* publication produced by DEQ (*DEQ 1996, 2002*).

Montana Streamside Management Zone (SMZ) Law

By the definition in *ARM 36.11.312 (3)*, Soup Creek is a class 1 stream. The remainding streams in the project area are class 2 or 3 streams based on site-specific conditions defined in *ARM 36.11.312 (4)* and *(5)*. Other than Soup Creek, no streams in the proposed project area contain fish, but some flow for more than 6 months of the year.

SEDIMENT DELIVERY

A DNRC hydrologist and an engineering specialist field reviewed the project area and identified a network of roads ranging from high to low standard in and around the proposed project area. Soup Creek Road meets all applicable BMPs and is not currently contributing sediment to Soup Creek. A Soup Creek Road spur in Section 20 of the project area was reviewed as a potential haul route. This spur, currently closed, has functional surface-drainage features on the road surface and a log-stringer bridge that crosses Soup Creek; the bridge is not strong enough to support loaded log trucks and the road would be difficult to maintain BMPs for hauling.

The remainder of the road system consists of low-standard roads on gentle grades (less than 8 percent). Much of these roads would require the installation of surface-drainage and erosion-control features in order to meet applicable BMPs. Several culverts are too short and/or undersized; road-fill material has been eroded at some of these sites, but, due to vegetation cover, current sediment levels are low. These crossings are tributary to a series of wetlands in and near the project area. Also 2 drive-through crossings on ephemeral draws are unimproved. These drive-through sites are currently well vegetated and not eroding, but may not function well for hauling purposes without improvements. These draws are discontinuous and do not deliver surface water to any other body of water.

Stream channels in the proposed project area are stable and rated in a fair to good condition. A majority of the channels are

connectors between a series of wetlands, which results in relatively low peaks during periods of flow. As a result, very little scour or in-channel erosion occurs in these systems. Soup Creek channel stability is rated in the fair to good range by DNRC hydrologists.

ALTERNATIVE EFFECTS

DIRECT AND INDIRECT EFFECTS TO SEDIMENT DELIVERY

- ***Direct and Indirect Effects of the No-Action Alternative to Sediment Delivery***

  Sediment delivery would not likely be affected beyond current occurrences. Existing point sources of sediment, both in-channel and out-of-channel sources, would continue to recover or degrade based on natural or preexisting conditions.

- ***Direct and Indirect Effects of the Action Alternative to Sediment Delivery***

  Blown down timber would be salvaged from approximately 550 acres. Portions of the project area have been managed for timber previously, other portions have not. Ground-based machinery would be used to harvest the salvage. The proposed units are not located within any SMZ, and where fisher buffers are applied, no salvage would occur within 165 feet of a stream. The only salvage that would occur within 165 feet of Soup Creek would be on the north side of the Soup Creek Road. The road ditch would effectively catch and filter any sediment that may come from that proposed unit. Sediment delivery to streams or wetlands is a very low risk due to the gentle slopes in the proposed project area, the distance of salvage activities from streams and wetlands, and the implementation of BMPs on skid trails and roads.

  Approximately 0.25 mile of new low-standard road would be constructed in Section 29 of the proposed project area; no stream or wetland would be crossed. Also, no impacts to a stream or wetland are anticipated as a result of this road. The primary purpose of this road is to provide a haul route that would avoid using the wooden bridge over Soup Creek. This bridge is in poor condition and is a potential source of sediment to Soup Creek. The bridge would be removed under the proposed project. All slopes would be laid back to a stable angle at the existing abutments and armored with large angular rock. The site would be seeded with erosion-control vegetation. The removal of the bridge would generate some fine sediment to Soup Creek during the period of operation. The long-term sediment delivery potential from this site would be reduced from the current situation. In addition, 6 culverts would replace existing pipes that are too short and/or have undersized diameters; 1 culvert would be newly installed in an unscoured ephemeral channel; and 2 existing drive-through crossings on ephemeral draws would be improved with talus to make them more stable for hauling. The drive-through crossings are located on ephemeral channels that do not contribute surface flow to a stream or wetland. These activities may lead to short-term increases in sediment due to bare-soil exposure. This increase would last until the bare soil grows new ground-cover vegetation, approximately 1 year. By replacing improperly functioning structures with structures that meet all applicable BMPs, the long-term risk of sediment delivery from these crossings would be lower following the proposed project.

CUMULATIVE EFFECTS TO SEDIMENT DELIVERY

- ***Cumulative Effects of the No-Action Alternative to Sediment Delivery***

  Sediment delivery would be very similar to those described in the *EXISTING CONDITIONS* portion of this analysis. All existing sources of sediment would continue to recover or degrade as dictated by natural and preexisting conditions until a source of funding became available to repair them. Sediment loads would remain at or near present levels.

- ***Cumulative Effects of the Action Alternative to Sediment Delivery***

  Cumulative effects to sediment delivery would be primarily related to roadwork, culvert replacements, and the proposed removal and rehabilitation of the bridge over Soup Creek. The sediment generated by the proposed replacement of existing culverts would increase the total sediment load in the wetland-dominated watersheds in the project area for the duration of activity. Sediment levels in Soup Creek would be elevated in the short-term during the period of bridge removal and reshaping of fill slopes. In the long term, the cumulative effects to sediment delivery in all proposed watersheds would be a decrease from existing levels. As the sites stabilize and revegetate, sediment levels resulting from these culvert replacements and installation would return to or drop below preactivity levels. Over the long term, cumulative sediment loads may be reduced due to better designed crossings. Improved design would reduce the risk of failure of the structures, which would reduce the risk of sediment delivery to downstream waters.

  The installation and improvement of erosion-control and surface-drainage features on existing roads would also affect the cumulative sediment delivery in the unnamed watersheds in the proposed project area. In the short term, the exposure of bare soil would increase the risk of sediment delivery to live streams. The utilization of all applicable BMPs during this work would make increased sediment loads unlikely. Over the long term, installation of more effective surface-drainage and erosion-control features on the existing road system would likely decrease cumulative sediment delivery to downstream waters.

APPENDIX E

WILDLIFE ANALYSIS

INTRODUCTION

The discussion in this section pertains to wildlife species and their habitat in the existing environment and the changes expected to that environment due to this proposal.

This discussion occurs on 2 scales. The Big Blowdown Salvage Project area includes DNRC-managed lands primarily along restricted roads in Sections 17, 18, 19, 20, 29, and 30, T24N, R17W. The second scale relates to the surrounding landscape for assessing cumulative effects. This scale varies according to the species being discussed, but generally approximates the size of the home range of the species in question. Under each grouping or species heading, the description for the cumulative-effects analysis area will be discussed. In the cumulative-effects analysis area, prior State actions and foreseeable future actions, along with current conditions on other ownerships, were considered and discussed. Species were dismissed from further analysis if habitat did not exist in the project area or would not be modified by any alternative.

To assess the existing condition of the project area and the surrounding landscape, a variety of techniques were used. Field visits, scientific literature, data from the SLI and Montana Natural Heritage Program, aerial photography, consultations with other professionals, and professional judgment provided information for the following discussion and effects analysis. In the effects analysis, changes in the habitat quality and quantity from the existing conditions were evaluated and explained. Specialized methodologies are discussed under the species in which they apply.

COARSE-FILTER ANALYSIS

INTRODUCTION

This project proposes to harvest blown down and standing dead trees. No changes in age classes, forested cover, connectivity, or covertypes would occur. Therefore, the coarse-filter analysis will only consider the direct effects of disturbance to wildlife species using the area and the indirect effects of the project related to deadwood habitats.

Deadwood (downed trees and snags) is an important component of the forested ecosystems. Five primary functions of deadwood in the forested ecosystems are: 1) increase structural diversity, 2) alter canopy microenvironment, 3) promote biological diversity, 4) provide critical habitat for wildlife, and 5) act as a storehouse for nutrient and organic matter recycling agents (Parks and Shaw 1996). This analysis focuses on the importance of deadwood as wildlife habitat and the effects of this project on those habitats.

Snags and downed trees provide feeding and rearing sites, along with shelter for an array of wildlife species. Deadwood provides insects, fungus, and wood food sources for small mammals. In turn, these small mammals provide prey for predatory birds and mammals. Additionally, deadwood provides areas with stable temperatures and moisture for animals, along with shelter from the environment, lookout areas, and food storage sites. Small mammals, such as red-backed voles, to large mammals, such as black bears, rely on deadwood for survival and reproduction.

The size, length, decay, and distribution of deadwood affect their capacity to provide specific habitat. Logs less than 6 feet in length tend to dry out and provide limited habitat for wildlife species. Single scattered downed trees could provide lookout and travel sites for squirrels or access under the snow for small mammals and weasels, while log piles provide foraging sites for weasels and denning sites for Canada lynx. Similarly, dbh, height, and snag densities determine the snag habitat value for wildlife species. Larger, taller snags tend to provide nesting sites, while shorter snags and stumps tend to provide feeding sites for birds and mammals. Cavity-nesting birds often nest in areas where several snags are available, while using individual snags as feeding or roosting sites. Therefore, it is important to consider the size and distribution of these resources.

The presence of insects and predaceous birds and mammals are important to forest management. Both insects and birds are suspected of controlling insects that are harmful to wood production, such as the Douglas-fir tussock moth and spruce budworm. However, at epidemic levels, mammalian and avian predators probably exhibit minor effects on population reductions (*Torgensen 1994*). Therefore, maintenance of habitats for insectivorous birds and mammals is important for long-term forest health.

EXISTING CONDITION - COARSE FILTER

The project area contains stands of a variety of age classes and covertypes that have received a variety of timber harvests (see *APPENDIX C - VEGETATION ANALYSIS* for detailed information), which affected the presence and attrition of deadwood. A wind event occurred in the spring of 2002, resulting in a large amount of wind-thrown timber, including many live trees. Additionally, the area is currently experiencing disease infections and insect infestations, especially the Douglas-fir bark beetle. Therefore, the project area in general, and the proposed units in particular, consist of clumped distributions of log piles and snags, along with scattered deadwood throughout the stands.

Presently, the project area consists of 1- to 2-acre patches of high concentrations of blown down timber and/or insect-infested and disease-infected trees intermixed in large areas with little damage or mortality. When averaging these patches over the entire stand area, 7 to 8 trees per acre blew down and about 5 trees per acre died due to insects and diseases, leaving 100 to 150 live trees per acre.

Direct and Indirect Effects - Coarse Filter

- ***Direct and Indirect Effects of the No-Action Alternative on Coarse Filter***

  No additional disturbance would occur in the area and the amount and distribution of deadwood would not be altered by DNRC-related projects.

- ***Direct and Indirect Effects of the Action Alternative on Coarse Filter***

  Under this alternative, approximately 7-8 downed trees per acre and 0.5 dead and dying trees per acre would be harvested, leaving preexisting downed trees and 4.7 snags per acre. Only downed trees and snags with sound wood would be removed. A downed tree determined to be unmerchantable would be left on site. Downed trees of questionable value would be checked by inserting a chainsaw blade into the log, thereby retaining the longest length of log possible on site. All western larch snags (an average of 0.8 tree per acre) and

any unmerchantable snags (an average of 3.9 trees per acre) would be retained, resulting in a retention of 4.7 snags per acre; of these, an average of 2.4 snags per acre are over 21 inches dbh.

The removal of sound snags and downed trees could alter the amount of feeding sites for insectivorous animals and available shelter for protection and reproduction. Recent beetle-killed trees provide a food source for woodpeckers and bark-gleaning birds. The removal of these trees is expected to reduce feeding sites. In the longer term, removal of these trees could reduce nesting habitat. However, this is not expected because nesting trees typically are infected with heartrot while alive. If these trees were infected to a degree that causes a substantial loss of wood value, the tree would be left on site; thereby, the loss of future nesting habitat would be reduced. Downed trees also provide foraging sites; therefore, removal of downed trees would add to the loss of foraging sites. Additionally, concentrations of downed material provide protection from predation and weather to a host of wildlife species. To mitigate the effects of these losses, all western larch snags, a preferred forage and nest tree species, would be left on site. Additionally, root wads, cull material, and preexisting downed trees would be retained.

The loss of feeding or reproduction habitat is not expected to substantially affect wildlife species in the area. The retention of unmerchantable trees would continue to provide foraging sites. Additionally, the retention of snags meets or exceeds the amounts in unharvested stands reported by *Harris (1999)* and western larch snags, a preferred nest and forage tree species, would not be harvested in the project area. Additionally, 100 to 150 live trees would be left on site, which could provide snag and log recruitment through time. Therefore, it is believed that the deadwood retention levels and the potential for future deadwood recruitment would continue to provide habitat in the project area for native species that rely on deadwood.

The structural components of the blowdown pockets could be lost or depleted due to this project; however, coarse woody debris would be retained throughout the proposed units. To mitigate some of the loss of blowdown structure, preexisting downed material, root wads, and unmerchantable material would be retained. These areas could offset some of the structural habitat loss for small to midsized mammals. Since most of the blown down trees to be harvested would be sound, changes in hollow log resources are not expected; therefore structure for large mammal habitat, primarily black bears, are not expected. The remaining live trees would continue to add log resources through time.

Cumulative Effects - Coarse Filter

- ***Cumulative Effects of the No-Action Alternative - Coarse Filter***

  No additional disturbance to deadwood habitat would occur. Other DNRC projects, such as the Goat Squeezer Timber Sale and Soup Creek Salvage projects, would continue in nearby areas. Douglas-fir bark beetle populations would continue to cause mortality in and around the project area. The increased tree mortality in Douglas-fir would provide additional foraging opportunities. The mortality of

these large trees reduces the potential for heartrot infection. Unless the affected tree was already infected with heartrot, additional nesting trees and hollow logs for use by wildlife species are not expected. Additionally, continued increased mortality would reduce snag and coarse woody debris over the long term. The recently killed trees would continue to provide wildlife forage and a source of Douglas-fir bark beetles, which would infect other trees.

- ***Cumulative Effects of the Action Alternative - Coarse Filter***

  The loss of deadwood resources would be additive to past reductions, primarily salvage harvests, on Swan River State Forest. The South Wood Timber Sale, Goat Squeezer Timber Sale, and Soup Creek Salvage projects are currently active or in the planning process. All these actions incorporated retention standards for snag and log retention. These standards were designed to retain adequate levels of deadwood for wildlife and ecological resources. This alternative would continue to remove deadwood from Swan River State Forest; however, as discussed earlier, mitigations to retain adequate amounts of deadwood and structure are expected to conserve important deadwood habitats.

FINE-FILTER ANALYSIS

In the fine-filter analysis, individual species of concern are evaluated. These species include wildlife species Federally listed as threatened or endangered, species listed as sensitive by DNRC, and species managed as big game by DFWP. These species are addressed below.

THREATENED AND ENDANGERED SPECIES

➢ Bald Eagle

The bald eagle is classified as "threatened" and is protected under the Endangered Species Act. Strategies to protect the bald eagle are outlined in the *Pacific States Bald Eagle Recovery Plan (USFWS 1986)* and *Montana Bald Eagle Management Plan (Montana Bald Eagle Working Group, 1994)*. Management direction involves identifying and protecting nesting, feeding, perching, roosting, and wintering/migration areas *(USFWS 1986, Montana Bald Eagle Working Group, 1994)*.

Bald eagles prefer multistoried nesting habitats with 40 to 70 percent canopy coverage and emergent trees within topographic line-of-sight to an associated water source with an adequate food supply. The emergent trees and/or snags need to be large enough (more than 25 inches dbh) to support nesting or perching bald eagles. Additionally, bald eagles prefer cottonwood, Douglas-fir, and ponderosa pine trees *(Wright and Escano 1986)*. In western Montana, bald eagles also use western larch and Engelmann spruce.

No nesting activity in or near the project area is documented. The nearest documented nest site is at the south end of Swan Lake, approximately 5 miles north of the project area. Potential nesting habitat exists along Swan River. Since this project would not occur near Swan River and existing large western larch trees and snags would be left, no effects to bald eagles are expected. Therefore, the bald eagle was considered no further in this analysis.

➢ Canada Lynx

Canada lynx are listed as "threatened" under the Endangered

Species Act. Currently, no recovery plan for Canada lynx exists. Several reports have been written to summarize the research on Canada lynx and develop a conservation strategy (*Ruediger et al 2000*).

Canada lynx are associated with forests of subalpine fir, generally between 4,000 to 7,000 feet in elevation, in western Montana (*Ruediger et al 2000*). Lynx habitat in western Montana consists primarily of young coniferous forests with plentiful snowshoe hares, stands with abundant coarse woody debris for denning and cover for kittens, and densely forested cover for travel and security. Additionally, the mature forests provide habitat for red squirrels, an alternative prey source. These conditions are found in a variety of habitat types, particularly within the subalpine fir series (*Pfister et al 1977*). Canada lynx tracks and observations are relatively rare in Swan Valley, and radio-collared lynx in the Seeley Lake vicinity rarely venture north of the Clearwater/Swan River divide (*J. Squires, personal communication, USFS, September 5, 2002*).

To assess Canada lynx habitat, DNRC's SLI data were used to map specific habitat classes used by lynx; these areas were considered *lynx habitat*. Any of these habitats located on ungulate winter ranges, as defined by DFWP, were removed from consideration of lynx habitat due to low snow loads that allow use of the area by many other predators, such as coyotes and mountain lions. These predators are able to outcompete and prey upon lynx. Other parameters (stand age, canopy cover, amount of coarse woody debris) were used in modeling the availability of specific types of lynx habitat in the area (i.e. denning, forage, other, temporarily not available).

- *Young forage* consisted of regenerating stands that are less than 39 years old and in a well-stocked condition (more than 1,500 trees per acre).
- *Mature forage* included all stands in lynx habitat that are greater than 40 years old and have more than 40 percent canopy closure.
- *Denning habitat* consisted of mature stands (older than 100 years) that have more than 40 percent canopy closure and a high abundance of coarse woody debris.
- *Temporary unavailable habitat* included all stands with regeneration less than 15 years old, stands that received precommercial thinning within the last 10 years, and stands with less than 40 percent canopy closure.
- *General habitat* included any habitat of a suitable habitat type with more than 40 percent canopy cover that could be used by lynx for travel or any other purpose.

Based on the above analysis, Canada lynx habitat comprised approximately 738 acres of habitat on State lands within the project area. All these acres of habitat occur below 3,600 feet in elevation. Of these acres, 126 acres of mature foraging, 52 acres of young foraging, 482 acres of general, and 78 acres of temporarily unavailable lynx habitats exist in the project area. These areas are lower elevation and on warmer and drier sites than those typically used by lynx (*McKelvey et al 2000, Squires 2000*).

Cumulative effects were analyzed for lands in the South Fork Lost

Soup Grizzly Bear Subunits. Presently there are 1,113 acres (9.1 percent) of denning, 5,194 acres (42.4 percent) of mature forage, 573 acres (4.7 percent) of young forage, 4,254 acres (34.7 percent) of travel, and 1,131 acres (9.2 percent) of temporarily unavailable habitat.

Direct Effects to Canada Lynx

- ***Direct Effects of the No-Action Alternative to Canada Lynx***

  No additional activities would occur; therefore, no direct effects would be expected.

- ***Direct Effects of the Action Alternative to Canada Lynx***

  Some disturbance of Canada lynx could occur in areas with adequate cover for lynx to travel through. However, lynx appear to be relatively tolerant of human presence and road use (*Mowat 2000*); therefore, no substantial direct effects would be expected. A slight potential increase for mortality due to road traffic on gated and/or new roads would be possible, though the risk of this occurring would be extremely small. Lynx do not appear to avoid roads at low traffic volumes (*Ruediger 2000*), so increased logging traffic on open and gated roads is not expected to displace or increase the energetic cost of individual lynx. The area is not likely to be used by lynx and lynx tend to be tolerant of human disturbance; therefore, negligible effects to Canada lynx are expected under the action alternative.

Indirect Effects to Canada Lynx

- ***Indirect Effects of the No-Action Alternative to Canada Lynx***

  Canada lynx habitat in the project area would be retained. Retention of jackstrawed piles of blown-down trees could offer additional foraging and denning habitat structure. However, these areas are lower and drier than habitats typically used by lynx, so the benefits of this retention are expected to be extremely small.

- ***Indirect Effects of the Action Alternative to Canada Lynx***

  Under this alternative, salvaging of dead, down, and dying timber would occur on 66 acres of mature lynx foraging habitat and 196 acres of general habitat. The proposed harvesting would not alter the availability of lynx habitat, but could reduce prey density by removing downed wood. Additionally, approximately 12 acres of young foraging habitat and 14 acres of other suitable habitat would undergo reductions of ladder fuels aimed at reducing fire hazards around private lands. These treatments are expected to reduce prey densities to some degree. The reductions are not expected to affect Canada lynx appreciably because these changes would occur in marginal habitats that are lower in elevation and drier than those typically used by lynx.

Cumulative Effects to Canada Lynx

- ***Cumulative Effects of the No-Action Alternative to Canada Lynx***

  No Canada lynx habitat would be modified. Forage availability would likely increase over the short term due to the added habitat structure provided by the pockets of blown-down timber. No additional reductions in quality or quantity would occur in the subunit.

- ***Cumulative Effects of Action Alternative B to Canada Lynx***

  The quality of Canada lynx foraging habitat could decrease, but the quantity of lynx habitat would remain constant. These changes would be additive to other projects in the South Fork Lost Soup Subunit. The changes in this and other projects alter Canada lynx habitat in marginal locations in the landscape; therefore, the effects of this alternative is highly unlikely to result in changes to lynx survival, reproduction, or use of the analysis area.

➢ Gray Wolf

The gray wolf is listed as "endangered" under the Endangered Species Act. The *Northern Rocky Mountain Wolf Recovery Plan* defines 3 recovery zones (*USFWS 1987*). The proposed project is in the Northwest Montana Recovery Zone. The 3 recovery zones met the recovery standards for the last 2 years and are expected to meet the 10 packs per recovery area this year, initiating the delisting process.

The gray wolf is a wide-ranging, mobile species. Adequate habitat for wolves consists of adequate vulnerable prey and minimal human disturbance, especially at den and/or rendezvous sites. Primary prey species in northwest Montana are white-tailed deer, elk, moose, and mule deer. The distribution of wolves is strongly associated with white-tailed deer winter ranges. Wolves in northwest Montana typically den in late April. Wolves choose elevated areas in gentle terrain near a water source (valley bottoms), close to meadows or other openings, and near big game wintering areas for dens and rendezvous sites.

The project area contains elk winter ranges, which could provide winter prey for wolves. Within the project area, the topography, access to water, and proximity to the big game winter range adhere to the description of denning and/or rendezvous-site habitats. However, because the project is located on elk winter range, instead of white-tailed deer winter range, the potential of wolf denning is reduced.

Another important component of wolf habitat is secure habitat away from roads. Highway 83 and the Soup Creek roads provide access to the area. These roads increase mortality risk due to automobile collisions or illegal harvesting. Other roads in the project area are restricted to administrative use by gates or berms. Wolves could use the project area as part of their home range or enable them to be transient to the area; however, no recent denning or rendezvous sites have been documented and no recent use has been documented in or near the project area (*T. Meier, personal communication, USFWS, 9/18/02*). Wolf habitat is not expected to be altered, and the proposed project would be completed by April 1, which precedes the onset of wolf denning. Therefore, the gray wolf was not considered further in this document.

➢ Grizzly Bear

Grizzly bears are listed as "threatened" under the Endangered Species Act. The Grizzly Bear Recovery Plan defines 6 recovery areas (*USFWS 1993*). This project is proposed in grizzly bear habitat in the North Continental Divide Ecosystem Recovery Area. The North Continental Divide Ecosystem Recovery Area is divided into subunits. Each subunit approximates the size of a home range for a female bear

and is separated from other subunits based on landscape features. This project is proposed in the South Fork Lost Soup Subunit.

Commitments made in the SVGBCA apply to this project. This project proposes to salvage 1 to 1.5 MMBF of wind-thrown and dead standing trees, which would be expected to exceed the 30-day timing stipulations set forth in Section 3(b)(iv) of the SVGBCA. Since this extraordinary wind event resulted in a large amount of salvageable material, DNRC requested an exception to the SVGBCA, as allowed under Section 3(b)(iv), to capture the value of these trees, reduce wildfire hazard, and help reduce Douglas-fir bark beetle populations. This exception has been tentatively approved, but official approval is still pending.

The Big Blowdown Project area is located in Sections 17, 18, 19, 20, 29, and 30, T24N, R17W (approximately 550 acres of harvest units) of the South Fork Lost Soup Grizzly Bear Subunit; Sections 19, 20, 29, and 30 fall within a linkage zone. In addition, the Soup Creek Salvage Project would be completed during the same period as this project (*FIGURE E-1 - LOCATION OF THE PROJECT AREA AND PROPOSED HARVEST UNITS*). This 48-acre harvest unit is expected to be completed in 1 week. The Big Blowdown Project area currently experiences disturbances associated with highway traffic and several open roads in and around the area (Soup Creek, Cilly Creek, and Center Loop roads). Grizzly bear use of the project area is probably limited due to the amount of disturbance inherent in the area; however, especially in spring and autumn, grizzly bears would likely travel through the area.

The proposed project would primarily use existing roads. To access harvest units, harvest, and haul timber, Use of approximately 0.9 miles of open roads, 0.2 miles of private/ administration; and 5.8 miles of restricted roads would be required to access harvest units and harvest and haul timber. Additionally, 0.1 miles of road would be constructed, and 0.1 miles of road would be abandoned by removing a bridge across Soup Creek. The road system accessed by the bridge across Soup Creek would be accessed from Highway 83 for this and future projects. Presently, all-terrain vehicle breeches are common at the closure device that restricts access over the bridge. Conversely, breeches of the barricade that restricts access off Highway 83 have not been documented since the inception of the SVGBCA monitoring program (1997).

Direct Effects to Grizzly Bears

- ***Direct and Indirect Effects of the No-Action Alternative to Grizzly Bears***

  No additional direct or indirect effects would occur.

- ***Direct and Indirect Effects of the Action Alternative to Grizzly Bears***

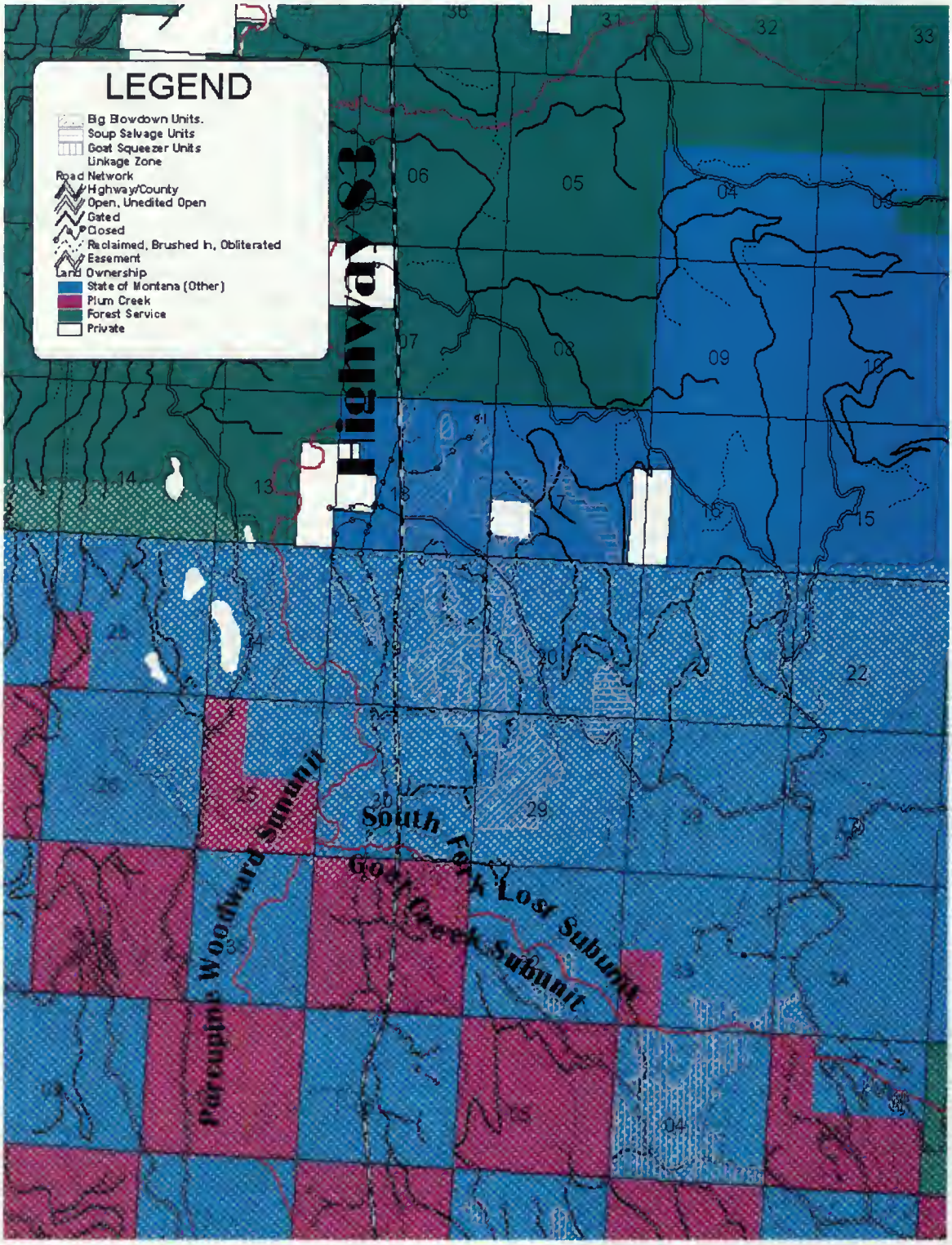
  The proposed project could result in direct effects to grizzly bears by displacing or preventing bear use of important habitats and indirect effects by altering habitat components. Areas of important habitat around Soup Creek would not be salvaged; thereby, unaltered movement corridors along Soup Creek would be retained. Salvage operations could occur in 79 acres of preferred habitat; however, vegetation important for hiding cover and visual screening would be retained. On 0.4 acres along the north edge of

Soup Creek Road and 2 acres along the western edge of private land in Section 17, a 66-foot width of ladder fuel vegetation would be thinned to reduce fire hazard to private property. In this area, visual screen/hiding cover could be reduced, but would be retained in the adjacent timbered stands. In other salvage units, trampling of vegetation and construction of skid trails could slightly alter small pockets or strips of hiding cover, visual screening, and/or forage. These areas would not likely affect the area's ability to provide habitat for grizzly bears appreciably. Since hiding cover, visual screening, and forage resources are not expected to be altered substantially; no change in bear use of the area is expected. Therefore, these effects are expected to be negligible.

Grizzly bears could experience minor direct effects due to the disturbance associated with the project. The increased disturbance could result in avoidance of the project and surrounding area while project is active. To mitigate additional disturbance, several strategies would be incorporated into the project design.

- Harvesting would occur between July 14 and August 31 of 2003 and during the denning period of 2003/2004. Project activities would avoid the spring and autumn periods.
- Harvesting activities in the linkage zone would be conducted as late in the summer period as possible, allowing a longer period of time earlier in the year when the area would not receive additional disturbance.
- During the 2003 bear year, only 1 other salvage project (Soup Creek Salvage Project) could occur on DNRC lands in the South Fork Lost Soup Subunit. The Soup Creek Salvage Project is adjacent to the proposed Big Blowdown Project area (*FIGURE E-1 - LOCATION OF THE PROJECT AREA AND PROPOSED HARVEST UNITS*). The Soup Creek Salvage Project is expected to be completed in approximately 1 week during the same time period as the Big Blowdown Salvage Project. All other planned projects on DNRC lands in the South Fork Lost Soup Subunit would be would be accomplished during the denning period or postponed to the summer period of 2004 or later.
- Signs and physical restriction devices (usually gates) would notify the public that restricted roads are still restricted to the public during the active and inactive periods (evenings, weekends, periods of shutdown, etc.) of harvesting.
- Once a restricted road system is opened for salvage operations, the operator using that system would be required to harvest all units accessed by that road system and secure the road, before moving to a new area. This design feature is expected to limit disturbance associated with harvest operations and road use to small areas in the project area at any one time. If more than one operator is working in the area, several systems could be used concurrently. If this situation occurs, more

FIGURE E-1 - LOCATION OF THE PROJECT AREA AND PROPOSED HARVEST UNITS



spatial disturbance could occur, but temporal disturbance would be reduced. This design feature does not apply to or incorporate the Soup Creek Salvage Project area.

- No harvesting would occur within 165 feet of Soup Creek or within other riparian areas. These areas could serve as movement corridors and foraging areas for grizzly bears and would not be affected by this proposed project.
- Visual screening and hiding cover would be retained to the largest amount possible. Salvage activities would not alter submerchantable vegetation through harvesting; however, limited damage could result due to skidding operations. Additionally, visual screening would be reduced in a 66-foot belt along the western edge of the private property in Section 17 (2 acres) and along the north side of Soup Creek Road (0.4 acres) to reduce fire hazards to private lands.

Increased disturbance could result in reduced habitat use and displacement of grizzly bears during project implementation. Grizzly bears tend to avoid areas with greater than 1 mile per square mile of precise open-road densities (*Mace et al, 1997*). This project would increase the amount of habitat potentially avoided due to road disturbance by 1,399 acres (4.7 percent) in the South Fork Lost Subunit, 34 acres (less than 0.1 percent) in the Porcupine-Woodward Subunit, and 11 acres (less than 0.1 percent) in the Goat Creek Subunit. Most likely, all the potential harvest units and associated road systems would not be active concurrently; thereby, the disturbance would be moved through these areas over the 49 days of activities. For instance, salvage harvests in the Soup Creek Salvage Project account for 547 acres affected by road disturbance, but that disturbance would be present for only 1 week. During activities, bears might alter their movements temporally or spatially to avoid one or several localized areas of disturbance. To limit the effects to bears, the disturbance associated with this salvage harvest would be confined to time periods (summer 2003 and denning seasons) when bear use of the project area is expected to be low and habitat most abundant. Potential avoidance of forage resources could occur, but due to the limited temporal (49 days) and spatial (limited to 2 adjacent project areas) design features, the effects of reduced habitat to grizzly bears are expected to be short-term and minor.

In addition to the salvage harvest, this project proposes removal of the bridge over Soup Creek that accesses the project area. Access to the project area would occur through a restricted road off Highway 83. This closure is secure and has not been breeched since the inception of the SVGBCA monitoring program in 1997. Removal of this bridge would improve grizzly bear security by decreasing ongoing illegal motorized access across Soup Creek.

Cumulative Effects

- ***Cumulative Effects of the Action Alternative to Grizzly Bears***

  Under this alternative, no cumulative effects are expected.

- ***Cumulative Effects of the Action Alternative to Grizzly Bears***

  During the implementation of this project, several other DNRC projects could be active in the vicinity. The Soup Creek Salvage Project is expected to be active for approximately 1 week between July 14 and August 31, 2003. The Soup Creek Project Area is adjacent to this project area; thereby, the amount of disturbance occurring would be concentrated in the subunit. Additionally, both projects would occur during the summer period, when habitat is abundant and bear use of the lower elevation areas is expected to be low.

  The adjacent Goat Creek Subunit will be in active status during the duration of this project. DNRC is proposing the Goat Squeezer Timber Sale Project in this subunit. In 2003, 912 acres in the northern portion of the subunit are proposed for harvest. These harvests would be initiated in late September or early October of 2003, at the earliest. The disturbance and activities associated with this project would not run concurrently with this project; therefore, cumulative disturbance would not occur. Additionally, no harvests would occur in the Goat Creek Subunit, so no additional cumulative effects to bears using that subunit are expected.

SENSITIVE SPECIES

When conducting forest-management activities, the SFLMP directs DNRC to give special consideration to the several "sensitive" species. These species are sensitive to human activities, have special habitat requirements that may be altered by timber management, or may become listed under the Federal Endangered Species Act if management activities result in continued adverse impacts.

TABLE E-1 - LISTED SENSITIVE SPECIES FOR THE NWLO SHOWING THE STATUS OF THESE SPECIES IN RELATION TO THIS PROJECT

Species	Determination - Basis
Black-backed woodpecker	No further analysis conducted - No recently (less than 5 years) burned areas in the project area would be affected.
Boreal owl	No further analysis conducted - All harvest areas occur below 5,000 feet elevation.
Coeur d'Alene salamander	No further analysis conducted - No moist talus or streamside talus habitat occurs in the project area.
Columbian sharp-tailed grouse	No further analysis conducted - No suitable grassland communities occur in the project area.
Common loon	No further analysis conducted - No large lakes occur in the project area.
Ferruginous hawk	No further analysis conducted - No suitable grassland communities occur in the project area.
Fisher	*Included* - Potential fisher habitat occurs in the project area.
Flammulated owl	No further analysis conducted - Ponderosa pine habitats did not occur in the project area.
Harlequin duck	No further analysis conducted - No harvesting would occur in potential habitat along perennial streams.
Mountain plover	No further analysis conducted - No suitable grassland communities occur in the project area.
Northern bog lemming	No further analysis conducted - No sphagnum or other fen/moss mats occur in the area.
Pileated woodpecker	*Included* - Western larch/Douglas-fir and mixed-conifer habitats occur in the area.
Townsend's big-eared bat	No further analysis conducted - No caves or mine tunnels occur in the project area.

Because sensitive species usually have specific habitat requirements, consideration of their needs serves as a useful "fine filter" for ensuring that the primary goal of maintaining healthy and diverse forests is met. The following sensitive species were considered for analysis. As shown in *TABLE F-1 - LISTED SENSITIVE SPECIES FOR NWLO SHOWING THE STATUS OF THESE SPECIES IN RELATION TO THIS PROJECT*, each sensitive species was either included in the following analysis or dropped from further analysis for various reasons.

➢ Fisher

Due to their use of mature and late-successional forested habitats, fishers are listed by DNRC as a sensitive species (*DNRC 1996*). DNRC's strategy to conserve fishers in a managed landscape is aimed at protecting valuable resting habitat near riparian areas and maintaining travel corridors.

Fishers, generalist predators, use a variety of habitat types, but are disproportionately found in stands with dense canopy (*Powell 1982, Johnson 1984*). Fishers appear to be highly selective of resting and denning sites. In the Rocky Mountains, fishers appear to prefer late-successional coniferous forests for resting sites and use riparian areas disproportionately to their availability. Fishers tend to use areas within 155 feet of water. Such areas contain large live trees, snags, and downed trees, which are used for resting and denning sites and dense canopy cover, which is important for snow intercept (*Jones 1991*). Timber harvesting and associated road construction could affect fishers by altering habitat and/or by increasing susceptibility to trapping.

On State trust lands in the project area, SLI data were analyzed (by covertype and age class) to assess potential fisher habitat using criteria outlined in *Heinemeyer and Jones (1994)*. In the project area, an estimated 468 acres provide resting/denning habitat, 760 acres provide foraging habitat, and 65 acres provide travel habitat.

The South Fork Lost Soup Grizzly Bear Subunit was used to assess cumulative effects. For a description of the subunit and ownership, please refer to *Grizzly Bear* in this analysis. In the cumulative effects analysis area, State trust lands provide potential denning/resting, foraging, and travel habitat. Continued salvage harvesting would continue to decrease the quality of fisher denning/resting habitat.

Direct Effects to Fishers

- ***Direct Effects of the No-Action Alternative to Fishers***

  No additional human disturbance would occur.

- ***Direct Effects of the Action Alternative to Fishers***

  Some displacement could occur; however, the effects of this displacement would be minor. The risk of displacement is approximately proportional to the amount of habitat affected. Areas along perennial streams provide high-use fisher habitat and travel corridors. To reduce effects to fishers, this project does not propose harvesting in these areas. Any increases in disturbance are expected to be minimal and short term.

Indirect Effects to Fishers

- ***Indirect Effects of the No-Action Alternative to Fishers***

  Fisher habitat would remain relatively unchanged in the short term.

- ***Indirect Effects of the Action Alternative to Fishers***

  Approximately 202 acres of denning habitat and 343 acres of foraging habitat would be modified by removing dead wood used by fishers and their prey. All downed wood and snags within 165 feet of perennial streams would be retained. The downed wood and snags retained in the 165-foot perennial stream buffer would provide increased denning/ resting sites and prey availability.

  Outside of the stream buffer, denning/resting sites, along with small mammal prey, could be reduced with the removal of snags and downed trees; however, by retaining the majority of snags and existing cull downed wood, the amount of denning/resting sites and forage availability that existed prior to the blowdown event would be maintained. The existing live trees would be expected to continue to provide snags and downed wood into the future.

  Since structural components of fisher habitat would be reduced in the uplands and retained in the 165-foot buffer around perennial streams, fisher habitat is expected to increase slightly over the conditions experienced prior to the wind event, but, overall, decrease over the existing condition. Therefore, fishers are expected to experience some habitat loss, but the retained habitat provides more structure than was present prior to the wind event. The proposed project would not prohibit use or travel through the project area.

Cumulative Effects to Fishers

- ***Cumulative Effects of the No-Action Alternative to Fishers***

  No additional cumulative effects would occur.

- ***Cumulative Effects of the Action Alternative to Fishers***

  This project would further reduce the quality of fisher habitat. The Soup Creek Salvage and Goat Squeezer Timber Sale projects are expected to reduce fisher habitat quality and quantity. The additional reduced quality is not expected to substantially affect fishers; therefore, minor cumulative effects are expected.

➢ Pileated Woodpeckers

Pileated woodpeckers are listed by DNRC as sensitive and play an important ecological role by excavating cavities that are used in subsequent years by many other species of birds and mammals.

Pileated woodpeckers excavate the largest cavities of any woodpecker. Preferred nest trees are western larch, ponderosa pine, cottonwood, and quaking aspen, usually 20 inches dbh and larger. Pileated woodpeckers primarily eat carpenter ants, which inhabit large downed logs, stumps, and snags. *Aney and McClelland (1985)* described pileated nesting habitat as "stands of 50 to 100 contiguous acres, generally below 5,000 feet in elevation, with basal areas of 100 to 125 square feet per acre, and a relatively closed canopy." The feeding and nesting habitat requirements include large snags

or decayed trees for nesting and downed wood for feeding, which closely tie these woodpeckers to mature forests with late-successional characteristics. The density of pileated woodpeckers is positively correlated with the amount of dead and/or dying wood in a stand (*McClelland 1979*).

Potential pileated woodpecker nesting habitat was identified by searching the SLI database for *old stands* with basal areas of more than 100 square feet per acre, more than 40 percent canopy cover, and below 5,000 feet in elevation. Based on these parameters, approximately 895 acres of potential nesting habitat for pileated woodpeckers exist on State trust lands. These acres are relatively connected. Younger-aged stands could provide feeding or nesting habitat of lower quality. Since the project area is large, the analysis conducted for the project area encompassed enough area to support a pair of pileated woodpeckers; therefore, the cumulative effects analysis area is the project area and adjacent parcels.

Direct Effects to Pileated Woodpeckers

- ***Direct Effects of the No-Action Alternative to Pileated Woodpeckers***

  No disturbance of pileated woodpeckers would occur.

- ***Direct Effects of the Action Alternative to Pileated Woodpeckers***

  Timber harvesting would occur outside of the pileated woodpecker nesting season; therefore, no direct effects to reproducing pairs or their nestlings are expected. Harvesting during the summer and fall could displace feeding woodpeckers. The effects of harvesting disturbances are unknown; however, *Bull et al. (1995)* observed a discernible woodpecker roosting near a harvest unit consistently throughout harvesting. If displacement of woodpeckers occurred, there appears to be abundant habitat in and adjacent to the project area; therefore, negligible negative direct effects would occur.

Indirect Effects to Pileated Woodpeckers

- ***Indirect Effects of the No-Action Alternative to Pileated Woodpeckers***

  No changes in nesting or feeding substrate would occur.

- ***Indirect Effects of the Action Alternative to Pileated Woodpeckers***

  Salvage harvesting would remove 7 to 8 downed trees per acre and 0.5 snags per acre from the proposed units. This material likely provides foraging, but not nesting, habitat. The harvest proposes to remove dying trees and recently dead, sound snags; all western larch snags, a preferred tree species used for nesting and foraging, would be retained to provide short-term forage and future nest sites. Retention of cull material, preexisting woody debris, nonmerchantable snags, western larch snags, and living trees would continue to provide foraging sites. Additionally, other stands in the project and adjacent areas could provide additional foraging habitat. In the short term, nesting substrate would be unaffected, but, potentially, reduced slightly in the future. The snag retention under this project (approximately 2.4 snags per acre over 21 inches dbh) exceeds the mean amount of large snags (greater than 21 inches dbh) in unharvested stands reported by *Harris (1999)* and more than double the

amount of snags/acre suggested by *Thomas (1979)*. Some small declines in foraging and nesting substrate could occur in the project areas, but these changes are expected to be minor and not affect the ability of pileated woodpeckers to use the area. Small openings could be produced under this alternative, but these openings are not expected to affect pileated woodpecker use of the area.

Cumulative Effects to Pileated Woodpeckers

- ***Cumulative Effects of the No-Action Alternative to Pileated Woodpeckers***

  No additional reductions in foraging and nesting habitat or movement corridors would occur.

- ***Cumulative Effects of the Action Alternative to Pileated Woodpeckers***

  Nesting and foraging substrate would be removed. This would be additive to the reductions of deadwood by unauthorized firewood cutting in the analysis area, resulting in decreased habitat for pileated woodpeckers. Nesting and foraging substrate are expected to be retained and the loss of dead wood to firewood cutters would be limited due to the increased effectiveness of planned road restrictions following harvesting activities. If the expected amount of dead wood was left on site, the effects to pileated woodpeckers would be minimal.

BIG GAME

DFWP delineated major winter ranges for big game species in the State. The project area lies in elk winter ranges. White-tailed deer, elk, mule deer, and moose use the area in the nonwinter period. Typically, moose winter in other areas farther away. The big game analysis focuses on elk winter range habitat.

The elk winter range occupies 733 acres of the project area and is the northern finger of an 80,000-acre contiguous winter range. The proposed project would not alter the existing condition of elk habitat, and most of the project area within the winter range would be harvested outside the winter period.

For cumulative effects, the project area, which approximates the winter home range of an elk herd, was considered. Additionally, this area is a northern finger of the continuous winter range and was analyzed as a separate winter range, with acknowledgement that the entire winter range lies to the south. The cumulative effects area consists of 693 acres of State trust lands and 40 acres of small private ownership.

Direct Effects to Elk

- ***Direct Effects of the No-Action Alternative on Elk***

  No additional direct effects are expected.

- ***Direct Effects of the Action Alternative on Elk***

  Harvesting activities during the summer and winter of 2003 could displace elk. The mitigations developed for grizzly bears require timing restrictions for units that incidentally occur in the elk winter range; therefore, harvesting activities in the winter range could occur during the winter period on all but 90 acres. However, no timing restrictions tie the harvesting of these acres to any season. An additional 15 acres in the winter range north of the Soup Creek Road are proposed for the winter period. Therefore, 15 to 105 acres of winter range could have harvesting activity during the winter period.

These harvests could result in the displacement of elk for a portion or the entire winter of 2004, depending on elk response. Since Soup Creek Road is an open road, the elk probably avoid the area north of this road. Due to the short harvest period, displacement past the winter of 2003/2004 is not expected. Any displaced animals could relocate south to the main winter range. The scale of the effects of this displacement is unknown, but due to the small area affected, the effects are expected to be minor.

Indirect Effects to Elk

- ***Indirect Effects of the No-Action Alternative on Elk***

  The existing blowdown and snag pockets would persist. The blowdown areas are likely unavailable to elk for forage and travel due to the physical obstruction of the downed trees. Snag pockets would eventually fall and provide areas similar to the pockets of blowdown. These pockets of blowdown and snags are small (1 to 2 acres) and not likely to prevent use of appreciable forage resources or prevent travel through the area presently or in the near future. The existing amount of thermal cover would be retained. This alternative, therefore, is expected to result in negligible negative effects.

- ***Indirect Effects of the Action Alternative on Elk***

  Pockets of large downed woody debris and snags would be harvested. The removal of this material would allow elk increased access to forage and travel through these pockets. The blowdown and snag pockets are small (1 to 2 acres) and not likely to prevent use of appreciable forage resources or prevent travel through the area presently or in the near future. Harvesting would not reduce the amount of thermal cover in the project area. This alternative, therefore, is expected to result in negligible positive effects.

Cumulative Effects to Elk

- ***Cumulative Effects of the No-Action and Action Alternatives on Elk***

  No other projects would occur concurrently and no future projects are planned in the project area; therefore, the effects discussed under the *Direct Effects to Elk* and *Indirect Effects to Elk* apply to the cumulative effects area.

APPENDIX F

FISHERIES ANALYSIS

INTRODUCTION

The Soup Creek watershed contains a population of bull trout. The Federal Endangered Species Act lists the bull trout as a threatened species. In an effort to protect existing bull trout populations and aid in the recovery of this species, DNRC is a member of the *Montana Bull Trout Recovery Team* (Recovery Team). DNRC is committed to following the Recovery Team's recommendations, as well as following recommendations of the *Flathead Basin Forest Practices Water Quality and Fisheries Cooperative Program (Cooperative Program)*.

ANALYSIS METHODS

The methodology to assess the status and potential impacts of the proposal to fish populations include habitat-quality monitoring, population monitoring, and risk factors to habitat degradation. The parameters for habitat quality include substrate scoring and streambed core sampling for percent materials less than 6.35 millimeters in diameter (McNeil coring). Measurement protocols for these parameters are outlined in the Cooperative Program report. According to the Cooperative Program report, a stream is considered threatened if the substrate score is less than 10 or the percentage of fine material is greater than 35 percent. A stream is considered impaired if the substrate score is less than 9 or the percentage of fine material is greater than 40 percent.

The risk factors to habitat degradation were evaluated in 2002 through a sediment-source inventory in the proposed project area and the road system leading into the proposed project area. The inventory included an assessment of channel stability and out-of-channel sediment sources.

ANALYSIS AREA

The fisheries analysis area is the portions of the Soup Creek watershed within and below the proposed project area. Monitoring data for population and habitat quality have been gathered in the Soup Creek watershed since 1996.

EXISTING CONDITIONS

Species-composition surveys in the Soup Creek watershed have identified the presence of brook trout, resident cutthroat trout, and bull trout.

The Recovery Team has identified the Soup Creek watershed as a bull trout core area. Core areas are defined as, "…watershed, including tributary drainages and adjoining uplands, used by migratory bull trout for spawning and early rearing, and by resident bull trout for all life history requirements." (*Montana Bull Trout Restoration Team, 2000*) In keeping with the recommendations of the Restoration Team and recommendations of DFWP biologists, DNRC has committed to a monitoring program in the Soup Creek watershed. The ongoing sampling in the watershed began in the summer of 1993. Results of the sampling are listed in *TABLE F-1 - FISHERIES MONITORING DATA FOR SOUP CREEK*. The results show some fluctuations in spawning occurrences, but an overall stable population. Substrate scores are in the acceptable range. McNeil core results are in the threatened level. Management implications and commitments for threatened habitat are listed in the *Flathead Basin Forest Practices Water Quality and Fisheries Cooperative Study*.

The inventory of sediment sources conducted in 2002 showed no existing point sources of sediment within the channels or from upland sites. Stream channels in the proposed project area are primarily in fair to good condition. The Soup Creek Road currently meets applicable BMPs for surface drainage and erosion control, and no instances of direct delivery to a stream were found during the survey. None of the existing stream-crossing structures in this portion of the Soup Creek watershed was identified as a barrier to fish passage. An old wood-stringer bridge located in Section 19 of the proposed project area crosses Soup Creek and is a potential sediment source to fish habitat. The bridge is in poor shape and is not structurally capable of carrying loaded-truck traffic. The decay found in the bridge makes it a moderate to high risk for failure. The failure of the bridge cribbing would allow the fill behind the abutments to be eroded by the creek.

TABLE F-1 - FISHERIES MONITORING DATA FOR SOUP CREEK

FISCAL YEAR	WESTSLOPE CUTTHROAT REDDS	BULL TROUT REDDS	SUBSTRATE SCORE	MCNEIL CORE
1993	---	2	10.1	---
1994	---	4	10.3	34.2
1995	12	2	10.2	34.9
1996	14	5	10.6	34.2
1997	22	8	10.9	34.1
1998	29	12	10.6	33.9
1999	21	8	10.4	35.3
2000	16	9	10.8	---
2001	17	12	10.4	37.0
2002	---	---	10.7	---

ALTERNATIVE EFFECTS

DIRECT AND INDIRECT EFFECTS TO FISHERIES

- ***Direct and Indirect Effects of the No-action Alternative to Fisheries***

  No direct or indirect effects on fish populations would occur in the Soup Creek watershed. Direct effects would be limited to those under current and natural conditions.

- ***Direct and Indirect Effects of the Action Alternative to Fisheries***

  Timber would be salvage harvested from approximately 550 acres. Some of the proposed project area has been previously managed; other portions have not been managed for timber. Ground-based machinery would be utilized to complete this salvage harvest. The proposed units are not located within any SMZs, and where fisher buffers are applied, no salvage would occur within 165 feet of Soup Creek, except where the Soup Creek Road lays between the unit and the stream.

  This alternative proposes to remove an existing bridge over Soup Creek. The wood-constructed bridge is rotting and is a moderate risk to collapse and fall into the creek. Removal of this bridge and rehabilitation and stabilization of the site would result in some sediment entering Soup Creek. The long-term indirect effect of removing the bridge and rehabilitating the site would be a decreased potential for sediment delivery through removal of the fill behind the abutments and revegetation of the site.

CUMULATIVE EFFECTS TO FISHERIES

- ***Cumulative Effects of the No-Action Alternative to Fisheries***

  The cumulative effects of the No-action Alternative would be similar to those described in the existing conditions. Fish habitat and populations would not be altered by this alternative.

- ***Cumulative Effects of the Action Alternative to Fisheries***

  The cumulative effects of this alternative would be related primarily to risk of fine-sediment delivery to a spawning stream. Risk of increased sediment loads from in-channel sources is unlikely because the allowable water-yield increase would not be affected by the proposed salvage (see *APPENDIX D - WATERSHED AND HYDROLOGY ANALYSIS*). Introduced sources of sediment would be related primarily to a proposed stream-crossing removal. These impacts would be short term during the course of operation. Once the work is completed, the supply of fine sediment would return to levels described in the existing conditions, and the long-term risk of sediment delivery to Soup Creek would be reduced by the removal of a potential sediment source.

  The effects of past ground-based operations in the proposed project area have not led to any identified sources of sediment to spawning sites in the Soup Creek watershed. The inclusion of the direct and indirect effects expected from the action alternative to the existing conditions would have a low risk of changing this. As a result, the proposed action alternatives would have low risk of cumulative impacts on fisheries populations in the Soup Creek watershed or downstream waters

APPENDIX G

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FINDING
PROPOSED BIG BLOWDOWN
SALVAGE PROJECT

An interdisciplinary team (ID Team) has completed the Environmental Assessment (EA) for the proposed Big Blowdown Salvage Project. After a thorough review of the EA, project file, public correspondence, Montana statutes, and the State Forest Land Management Plan (SFLMP), I have made the following 3 decisions:

1. ALTERNATIVE SELECTED

Two alternatives are presented and were fully analyzed in the Environmental Assessment (EA):

- No-Action Alternative A includes existing activities, but does not include the salvage of wind-damaged and blown-down trees or trees being killed or damaged by the Douglas-fir bark beetle and white pine blister rust.
- Action Alternative B proposes to:
  - salvage approximately 1 to 1.5 million board feet (MMBF) of wind-damaged and blown-down trees or trees being killed or damaged by the Douglas-fir bark beetle and white pine blister rust;
  - remove an old wooden bridge;
  - build approximately 0.25 mile of road to access the road system isolated by removing the bridge;
  - replace native and undersized culverts;
  - upgrade road-surface drainage to meet Best Management Practices (BMPs);
  - apply forest fuel-reduction treatments to State lands and adjacent private lands; and
  - allow Friends of the Wild Swan to purchase logs in lieu of salvaging within Area B of the Sprunger-Whitney Nature Trail Land Use License.

I have selected Action Alternative B with the following requirements:

- Friends of the Wild Swan will be offered the option of purchasing the logs for $4,782 in lieu of salvaging within Area B of the Sprunger-Whitney Nature Trail Land Use License.
- Mitigations and specifications identified in the EA will be implemented as prescribed.

Action Alternative B has been selected for the following reasons:

- Action Alternative B meets the *PURPOSE OF ACTION* and the specific project objectives listed on page 1 of the EA.

- DNRC is required to salvage timber damaged by insects, diseases, fires, or wind before it loses value to decay, provided such harvesting is economically warranted *(Montana Codes Annotated [MCA] 77-5-207)*.
- The analyses of identified issues did not reveal information to persuade the Department to choose the No-Action Alternative prior to this decision.
- Action Alternative B includes activities to address concerns expressed by the public and local government entities with jurisdiction, including, but not limited to:
  1) The project is designed to not harvest within fisher buffers or streamside management zones (SMZs).
  2) Adequate numbers of snags and snag recruits will remain in the area to provide for important wildlife habitat and down woody debris.
  3) The value recovery of the salvaged timber for the associated trust beneficiaries will occur before substantial value is lost.
  4) Haul routes will meet BMPs.
  5) The removal of insect-infested trees may reduce the risk of bark beetle infestations in the remaining live trees.
  6) The risk of wildfire will be reduced on State land adjacent to private landowners.
  7) Friends of the Wild Swan will be offered the option of purchasing the logs in lieu of salvaging Area B of the Sprunger-Whitney Nature Trail Land Use License. There are 150 tons of logs within Area B, valued at $31.88/ton. If harvested, the logs will be skidded away from the construced nature trail and not across the trail.
  8) Project activities will comply with the Swan Valley Grizzly Bear Conservation Agreement, including a minor exception granted by the United States Fish and Wildlife Service during the summer operating season.

2. SIGNIFICANCE OF IMPACTS

For the following reasons, I find that Action Alternative B will not have significant impacts on the human environment:

- I find that none of the impacts are regarded as severe, enduring, geographically widespread, or frequent. Further, I find that the quantity and quality of various resources, including any that may be considered unique or fragile, will not be adversely affected to a significant degree. I find no precedent for future actions that would cause significant impacts, and I find no conflict with local, State, or Federal laws, requirements, or formal plans. In summary, I find that the identified adverse impacts will be avoided, controlled, or mitigated by the design of the project to the extent that they are not significant.

- Locally Adopted Environmental Plans and Goals - In June 1996, DNRC began a phased-in implementation of the SFLMP. The SFLMP establishes the Agency's philosophy for the management of forested trust land. The SFLMP philosophy and appropriate resource management standards are incorporated in the design of the proposed project.

- Recreational Activities - Recreational opportunities will continue and not be negatively affected by the proposed project.

- Precedent Setting and Cumulative Impacts - The project area is located on State-owned lands that are "principally valuable for the timber that is on them or for growing timber or for watershed protection" *(MCA 77-1-402)*. Since the EA does not identify future State actions that are new or unusual, the proposed salvage project is not setting precedence for a future action with significant impacts.

  Taken individually and cumulatively, the proposed activities are common practices and no project activities are being conducted on important fragile or unique sites.

  The proposed salvage project conforms to the management philosophies of DNRC and is in compliance with existing laws, policies, and standards applicable to this type of proposed action.

3. SHOULD DNRC PREPARE AN ENVIRONMENTAL IMPACT STATEMENT (EIS)?

Based on the following, I find that an EIS does not need to be prepared:

- The EA adequately addressed the issues identified during project development and displayed the information needed to make the decisions.

- Evaluation of the potential impacts of the proposed Big Blowdown Salvage indicates that no significant impacts would occur.

- The ID Team provided adequate opportunities for public review and comment. Public concerns were incorporated into the project design and analysis of impacts.

Robert L. Sandman

Unit Manager
Stillwater State Forests
05/7/03

BIG BLOWDOWN SALVAGE PROJECT
ACRONYMS

ARM	Administrative Rules of Montana
BMP	Best Management Practices
CEA	Checklist Environmental Assessment
dbh	diameter at breast height
DEQ	Department of Environmental Quality
DF	Douglas-fir
DFWP	Montana Department of Fish, Wildlife and Parks
DEIS	Draft Environmental Impact Statement
DNRC	Department of Natural Resources and Conservation
EA	Environmental Assessment
EIS	Environmental Impact Statement
FEIS	Final Environmental Impact Statement
FI	Forest Improvement
FNF	Flathead National Forest
ID Team	Interdisciplinary Team
MBF	thousand board feet
MCA	Montana Codes Annotated
MEPA	Montana Environmental
MMBF	Million Board Feet
NWLO	Northwestern Land Office
SFLMP	State Forest Land Management Plan
SLI	Stand-level Inventory
SMZ	Streamside Management Zone
SVGBCA	Swan Valley Grizzly Bear Conservation Agreement
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service

124 Permit	Stream Preservation Act Permit
318 Authorization	A Short-term Exemption from Montana's Surface Water Quality Standards
Cooperative Program	Flathead Basin Forest Practices Water Quality and Fisheries Cooperative Program
Land Board	State Board of Land Commissioners
Recovery Team	Montana Bull Trout Recovery Team

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